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# THE ARCHITECTURAL FORUM

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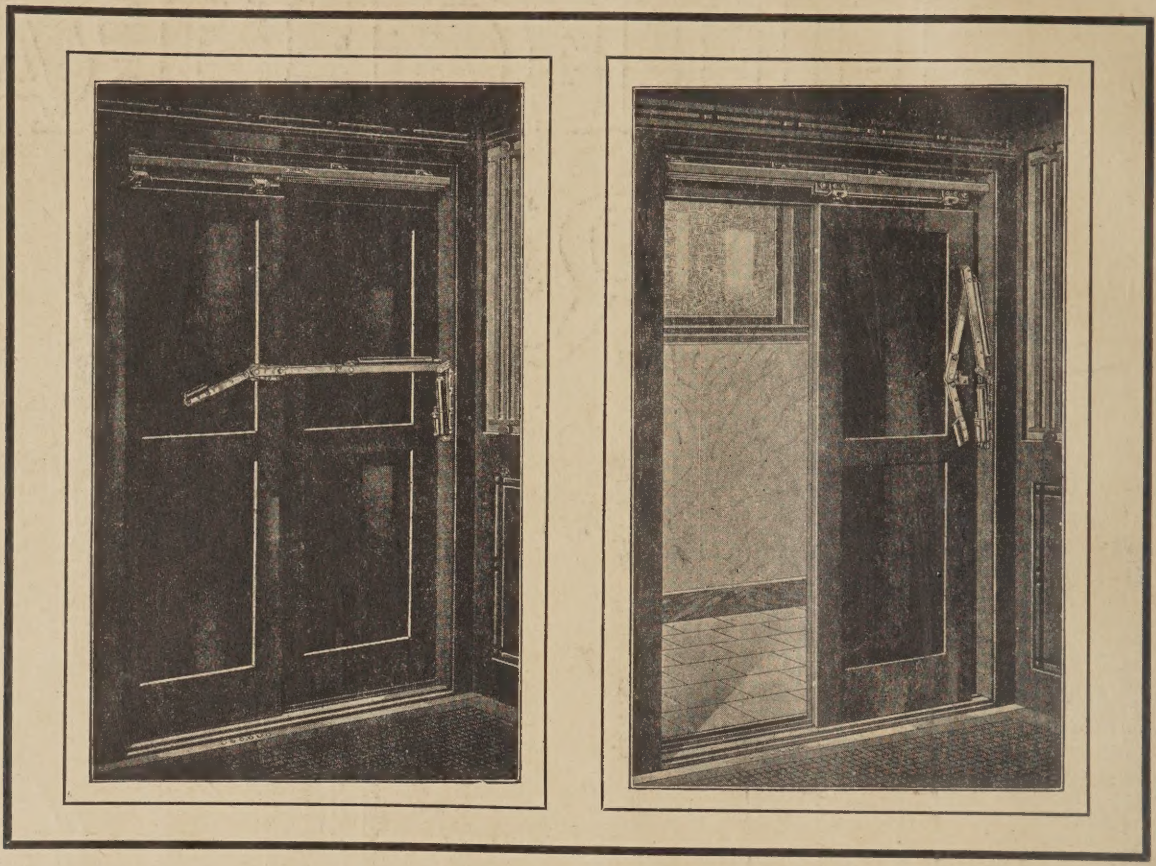

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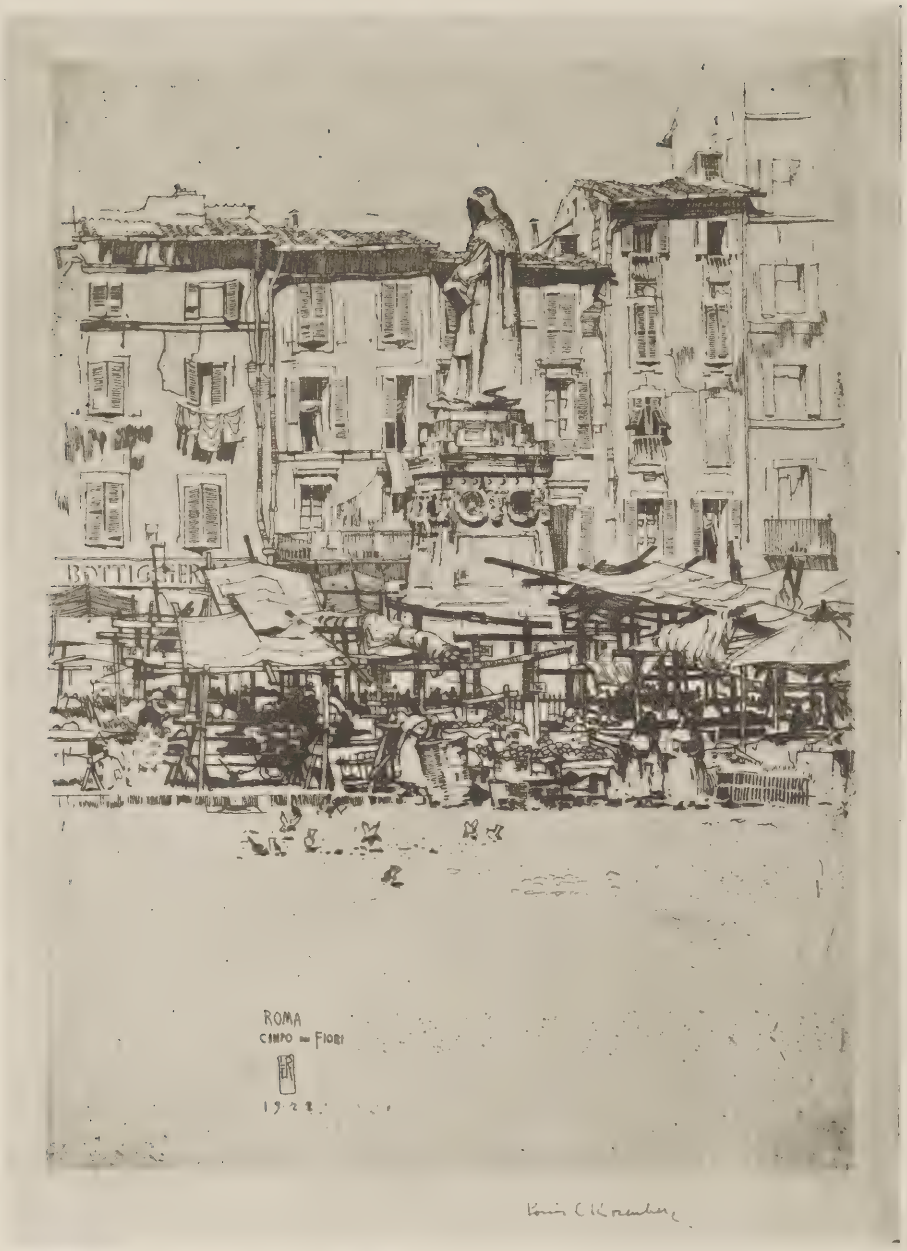

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CAMPO DEI FIORI, ROME
FROM ETCHING BY LOUIS C. ROSENBERG

The
ARCHITECTURAL
FORUM

Volume XL JANUARY 1924 Number 1

# The Public Library Building Plan—I

*By* JOHN ADAMS LOWE

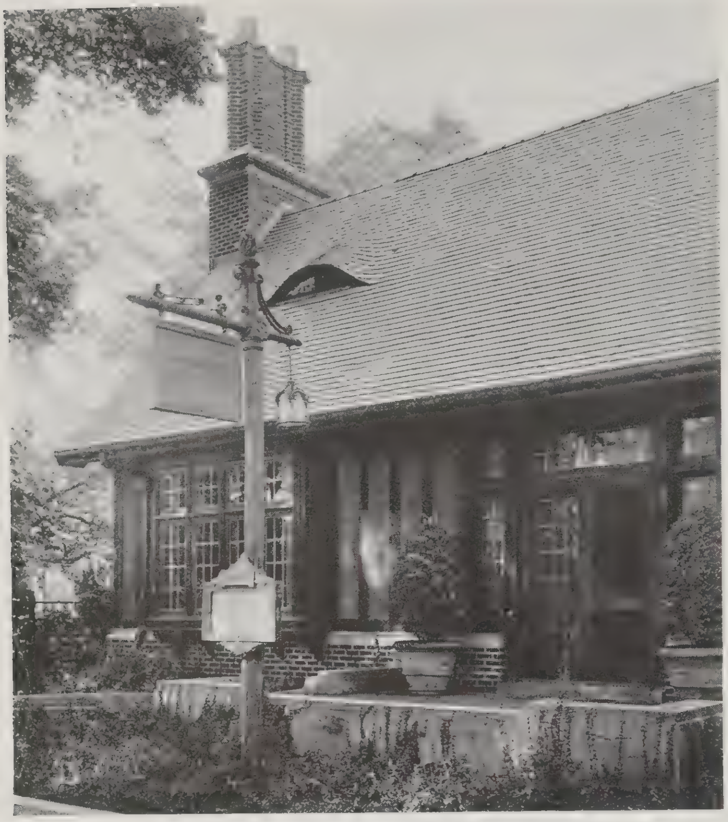
*Assistant Librarian, Brooklyn Public Library*

THE successful public library of today is not one carelessly planned in a chimney corner of the drafting room of a great architect's office; nor is it one designed by an apprentice to whom the problem has been thrown as a solace for tedious routine accomplished elsewhere. Nor is it one patched together by donor or trustees from features bodily stolen, by the scrapbook method, from more or less successful buildings. The successful plan is one evolved by sympathetic architect and librarian who have studied and understand the community, who know what a library is and what it does, and who have the skill to create in wood and stone a building which shall express the spirit and render the service possible.

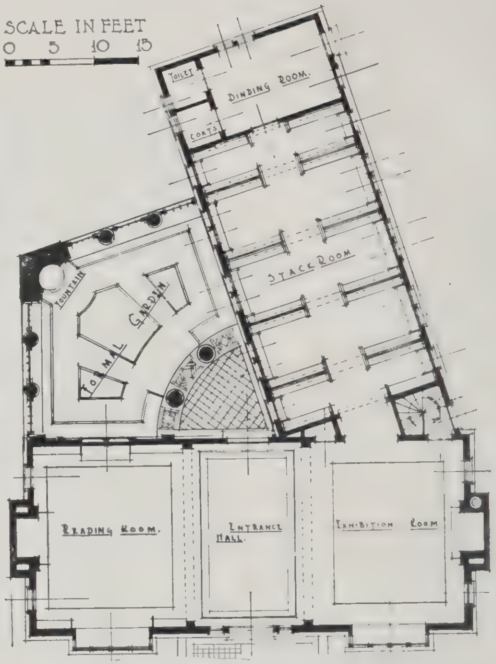
Time was when a library building was considered the plaything of a privileged few, a treasure house, a storage vault, a monument. Mausoleums and tombs have been designed as library buildings, with the result that the books deposited in them became a collection of dead things and remained buried within. The tradition of its being the confined realm of spinster librarianship and the home of a novel-lending agency is past. Today such a building houses a plant organized for rendering trained information service, for distribution of books intelligently selected for recreation and inspiration, for offering a common intellectual meeting ground to the entire community without racial, political or sectarian distinction, for teaching the value of print and encouraging the use of it, for helping people to be capable and moral citizens. And by one means or another the details of its plan must be adapted to these functions and made to express them.

In buildings to be erected in small rural communities and in the large towns and cities it will be necessary to plan adequate space for books accessible to the public, for the clerical work of drawing and returning books, for an adults' reading room and another for children, for reference and study purposes, for a librarian's office, a workroom and a staff rest room, for a meeting place for lectures, for study rooms and club rooms, and possibly for exhibitions and a local historical museum, in addition to the usual appointments for heating and janitor service. Even in small rural libraries today library service touches the interests of every individual who can read. Aside from the ordinary fiction reader, the farmer, the merchant, manufacturer, teacher, doctor and preacher come for books for study purposes. Teachers gather in the building in groups to learn for themselves about the book resources and to have their pupils taught by the librarian how to use books in school work. The librarian conducts story hours for children, and book review and current events meetings for busy adults. She organizes reading clubs for boys and girls, and forums for men and women. Not infrequently Boy Scouts and Girl Scouts hold their meetings here and make books a part of the program. Lectures on all kinds of subjects that may interest the people of the community are held in the auditorium. Picture collections are made available for schools or other study purposes. Such exhibitions as "Art in Advertising," or those dealing with birds and bird houses, textiles, local industries, town history, the fauna and flora of the vicinity, are part of the regular routine. Groups of foreign-speaking citizens meet in classes to study English, sewing, cooking and manners and customs of America. Any activity or interest connected with books or print becomes a legitimate part of library service. On the other hand, the library cannot be expected to house a gymnasium, amusement rooms, moving picture theater, fire engine house and similar apparatus, town offices, and various other worthy enterprises for which space is frequently demanded. Anything which is not essentially concerned with the use of print has no place in a library building. The same type of service is rendered in small towns and large cities. The chief difference lies in the amount of service given. One building suffices in a small town, whereas in cities branch buildings are necessary in order to render the same service to scattered neighborhoods or congested districts.

No hard and fast laws have been laid down for a

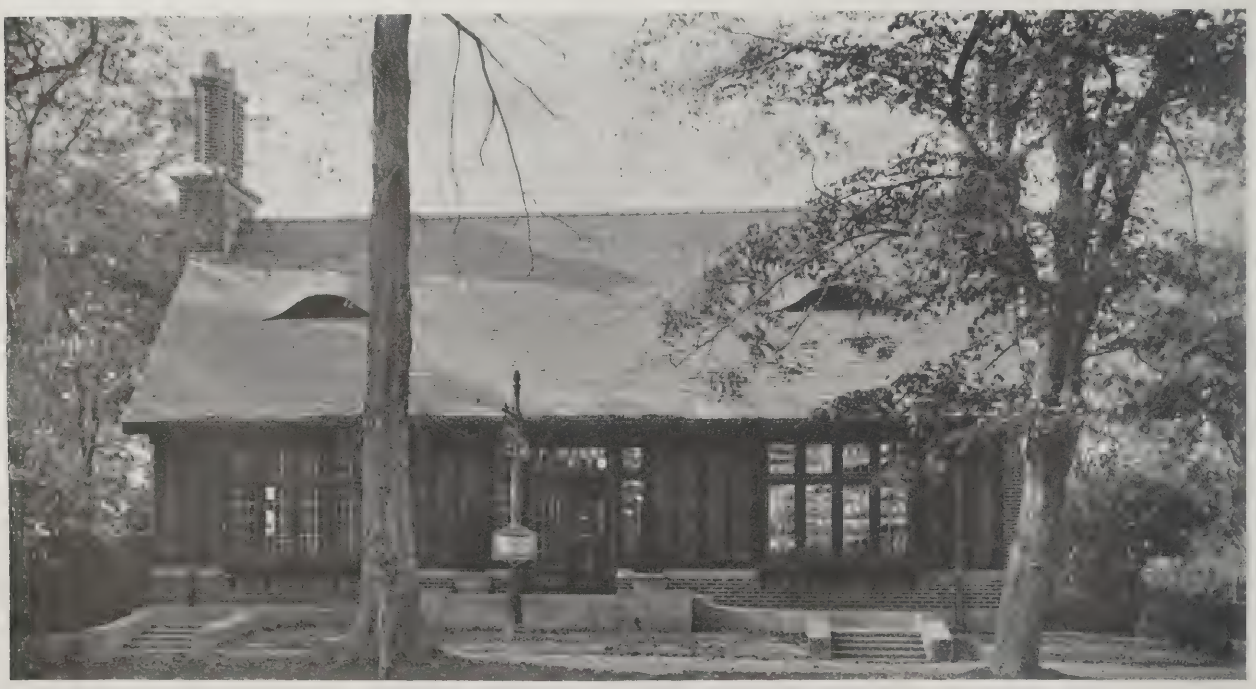


Detail of Front, Easthampton Free Library



First Floor Plan, Easthampton Library
Aymar Embury II, Architect

library building plan. In the past the conventional plan was conscientiously copied, and the single-storied building over a high basement has become general. It is agreed that the greater part of the work must be conveniently arranged for one floor, and wherever land is available it is deemed unwise to build into the air. Whenever a second story is demanded, the rooms less frequently used by the public may be planned there. There is a close relationship between several of the units, but it is not so close as precedent would seem to indicate, and there is everywhere a willingness to try arrangements which shall preserve essential relations, but increase the use and meaning of the integral parts. Partitions are almost entirely done away with because they prevent rearrangement of



Easthampton Free Library, Easthampton, N. Y.
Aymar Embury II, Architect

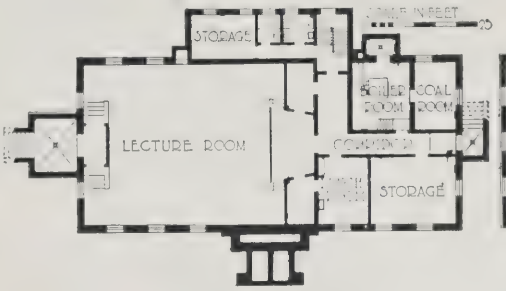
space, increase expense of oversight, and restrict light and ventilation. Bookcases are used wherever it is necessary to indicate divisions.

Space on the main floor of a small library building having an area of approximately 2,000 square feet might be divided in these proportions: delivery room, 225 to 275 square feet; general book room, 400 to 450 square feet (book capacity 2,000 to 2,500 volumes); adult reading room, 375 to 425 square feet (book capacity 2,500 volumes, seating capacity 20); reference room, 275 to 300 square feet (book capacity 1,000 volumes, seating capacity 10); children's reading room, 475 to 500 square feet (capacity 2,000 volumes, seating capacity 20); librarian's office and workroom, 175 to 200 square feet (capacity 500 volumes). By "room" is meant space devoted to the purpose designated rather than an area enclosed within partitions. An auditorium with a platform and small dressing room (1,000 square feet, seating capacity 150) and a local historical museum (400 to 450 square feet) would presumably be included in such a building. These, however, are not to be considered features but rather incidentals, and would probably never be placed on the main floor, usually in an upper story.

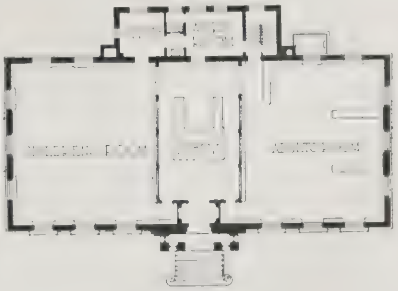
In larger buildings the spaces would be increased essentially in the same proportions, with possibly a study room, a staff rest room, a workroom and a club room or two added to the general requirements. A word should be said about club rooms. Theoretically, work with clubs is interesting and important, but practically it cannot take an important place in the routine of most libraries because the staff is too small. The size of staff and the probability of club work being carried on should be carefully considered before space is cut up into club rooms. It may be more urgently needed for some other part of the work.

The delivery room is the "salesroom," the business center of the library. In small buildings it is simple to plan this space and to arrange the loan desk in such an alluring, compelling, welcoming manner that it shall become more nearly the soul than the heart of the place. In larger buildings this element seems often to have been forgotten. Many a building might be cited in which this room might have been planned as acceptably for a Roman bath or for the waiting room of a railway station.

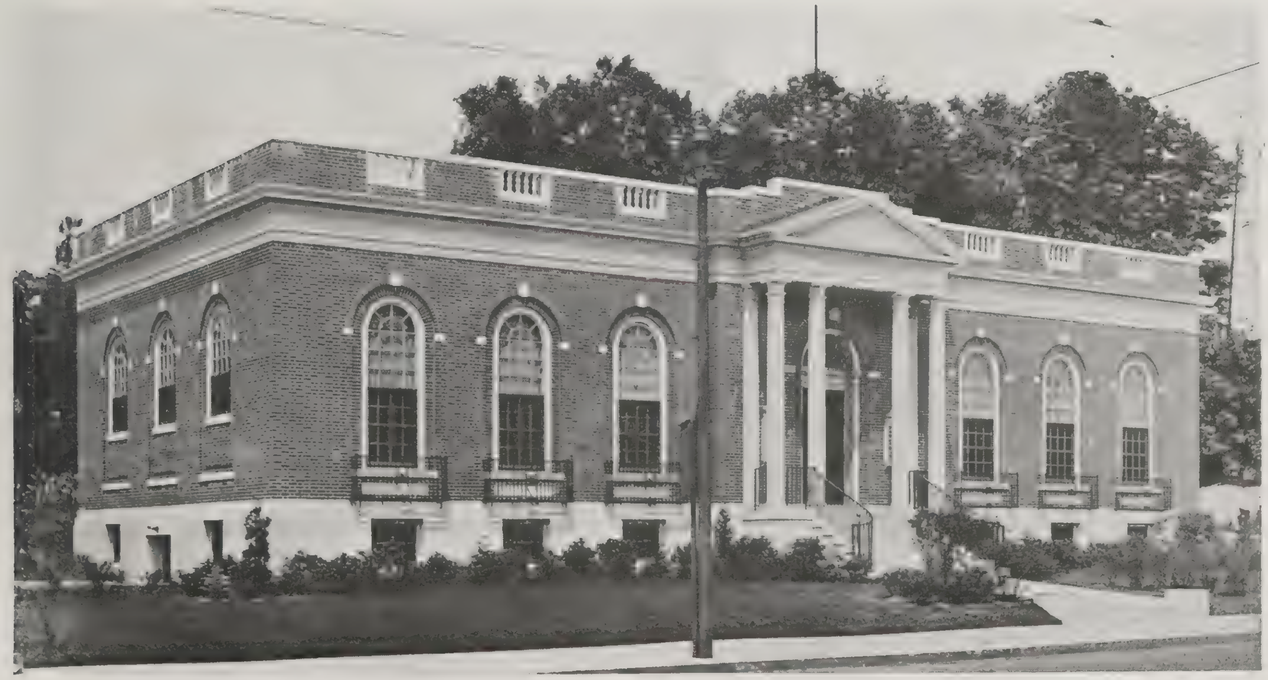
The West Roxbury Branch Library is constructed of waterstruck brick and pre-cast concrete stone trim. Floors are reinforced concrete finish on the first floor with ½-inch cork tile, and granolithic in the basement. Heating is by steam. Cost complete was $55,530, and including furniture and grading $59,566.66. The cubic foot cost was 42 cents, and 45 cents including the furniture, in 1921.



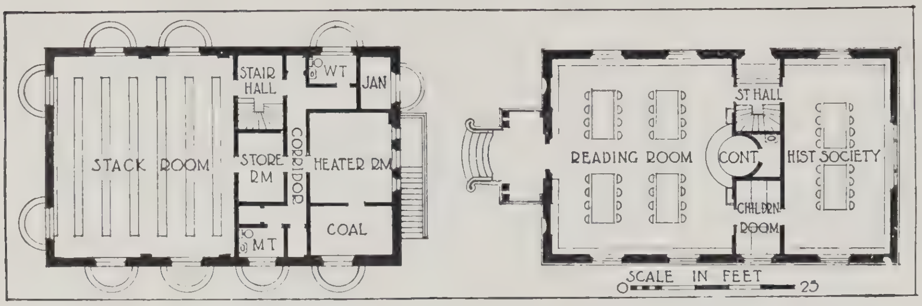
Basement Floor Plan



First Floor Plan



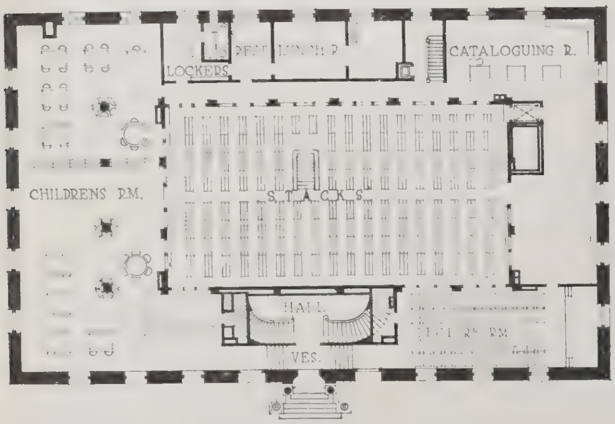
Branch Library for City of Boston, West Roxbury, Mass.
Oscar A. Thayer, Architect



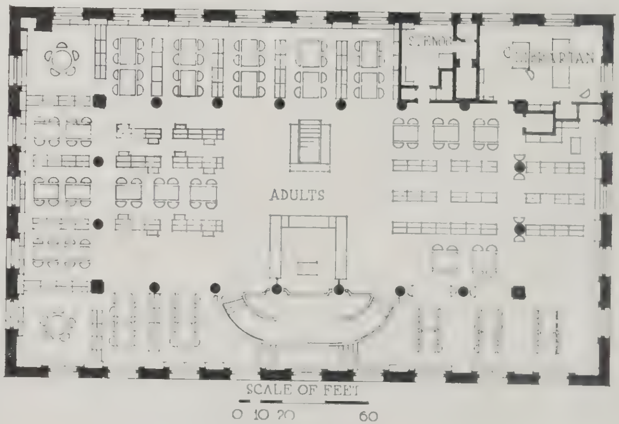
This plan violates the essentials of a good library arrangement. The children's room is little more than a closet. The main book collection is placed on stacks in a dark, damp basement, inaccessible to and inconvenient for both public and librarian. Casual borrowers and children must all pass the reading room tables to reach the delivery desk. The librarian has no workroom or even a place to hang her hat.

Several factors come into the problem of planning the delivery room space, location, administration and light being chief. The location is more or less determined by its necessary proximity to the entrance. It should be sufficiently separated from reading and reference rooms so that noise and confusion caused by people returning and drawing books will not disturb readers. A wide, open space will be required between the delivery desk and all adjoining rooms to give sufficient opportunity for oversight and proper light. Natural light is absolutely essential at this point, for a great deal of important clerical work is done at the loan desk. The card catalog and bulletin boards are to be provided for here. Tables or shelves will be needed for display of books only, and a bench or a chair or two for persons waiting for books may possibly be considered. It is not necessary to allot space for readers here. Books are necessary in the delivery room. It is a question, to my mind, whether it is wise or feasible to make the entire book collection accessible to the delivery desk, but if it is not so placed, ample shelves will be needed for a large and constantly changing collection of books. One might as well expect to get a thrill when the nursery door is thrown open disclosing no happy children playing there as to do so when the library door is pushed in, revealing no books luring and beckoning.

When it comes to the matter of administration the solution is not so clear. In the small building the librarian will be at the loan desk during the hours the library is open, and should have an unbroken view of the entire floor, delivery space, reading room, children's room and reference room. She will in all probability be close enough to render assistance when needed and to maintain discipline. Many larger buildings have been designed as an amplified one-man plan, and the result is illogical and incongruous. Think of the usual type of library with its delivery space in the center, the children's room to the right and reading room to the left. They tell you it was planned so that the entire building can be supervised by one person. It is most essential to plan for a small staff, but one person can cover only about so much ground after all. In all but the smallest libraries during busy hours all the attention of an assistant, several of them probably, will have to be focused upon the demands of the loan desk. They cannot then be responsible for work or discipline in the reading rooms. Moreover, as a matter of practice, even in buildings planned with this supervision from the loan desk in mind, attendants are stationed in these



Ground Floor Plan

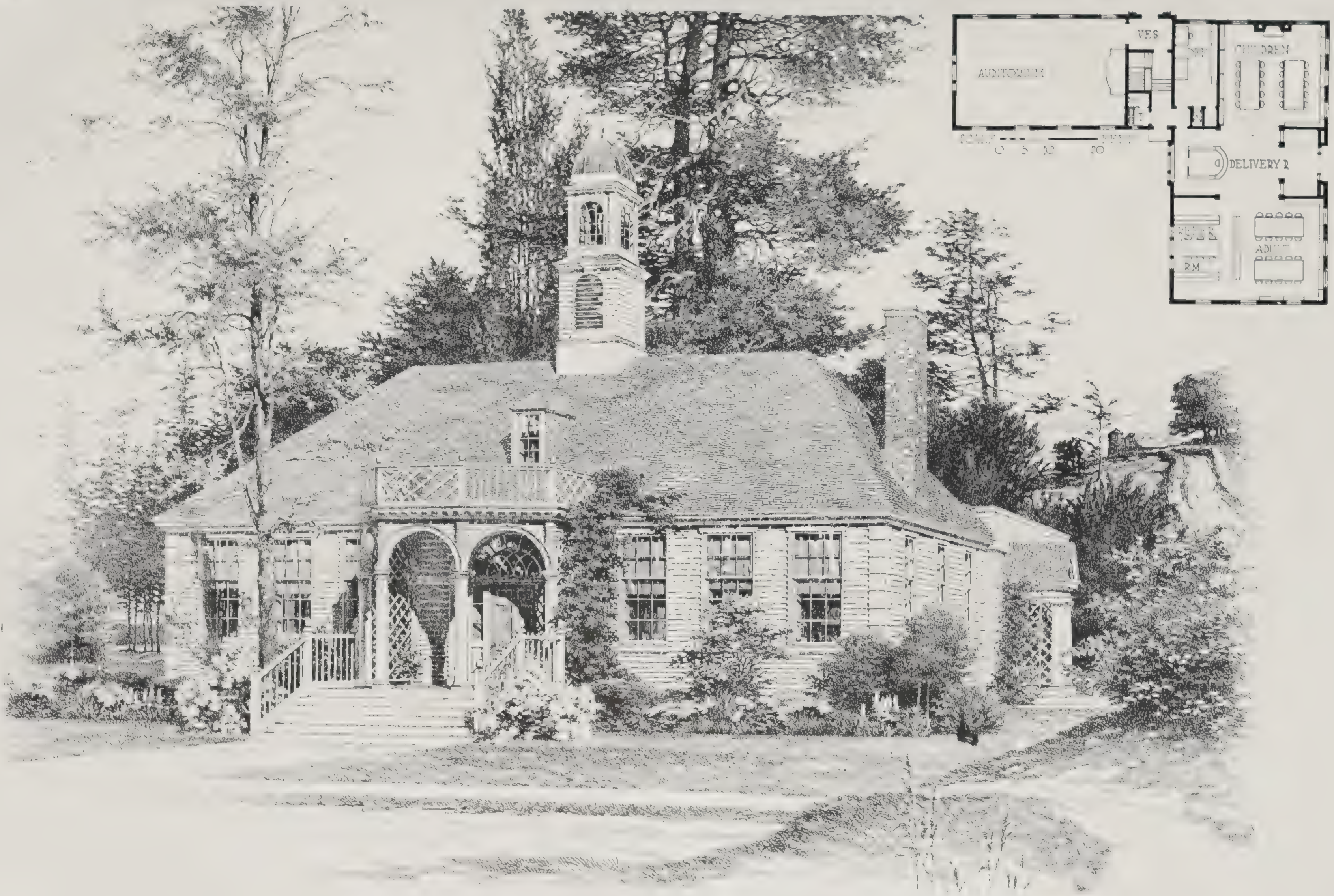


Main Floor Plan

This library, built in 1914 at a cost of $125,000, is situated in a city of 97,000 people. A staff of 40 serves the library, and the stackroom has a capacity of 120,000 volumes, while 25,000 are contained in the open shelves of the book room and reading room.

The stackroom's being at the center of the ground floor makes possible ample light, ease of access and ready supervision of the different departments, and workrooms are so carefully planned and correlated that processes and work travel are reduced to a minimum. The children's room (seating 66) and the lecture room (accommodating 150) are entered directly from the vestibule. The librarian suggests that the charging desk in the children's room be turned around, so that the attendants may face the room and not be obliged to turn their backs on the entrance. The library circulates about 500,000 volumes annually.

**Public Library, Somerville, Mass.**
Edward L. Tilton, Architect



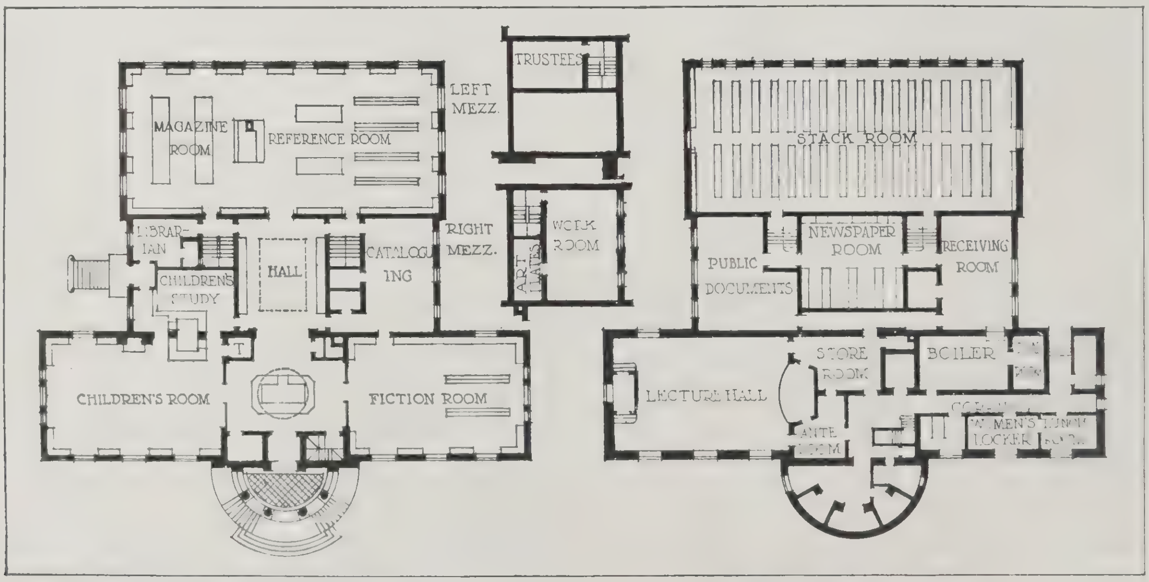
FIRST PRIZE DESIGN FOR A RURAL LIBRARY BUILDING
SUBMITTED IN COMPETITION BY RICHARD M. POWERS AND ALBERT C. MACLELLAN

*Reproduced by Courtesy of The White Pine Series of Architectural Monographs* rooms during busy hours. Why not then be frank enough to face the issue if there is any advantage to be gained in separating these rooms? An adequate staff being available, why not consider the delivery space as a separate unit and plan it in such a manner that book circulation can be most effectively done? Librarians are contemplating changes in the general scheme of this room. Some would subordinate the loan desk to merely a place to register, to return and draw books, and would relegate it to an inconspicuous position at the side of the main entrance. This may be suggested by the function of the cashier's desk in certain types of cafeteria. Other librarians would turn the delivery space into something closely akin to the most fascinating bookshop ever devised, with live and important books carefully selected, judiciously grouped and attractively displayed on counters and tables, making ample provision whereby accounts of books drawn and returned can be carefully recorded. The delivery room, which is going to be crowded during certain hours, will be planned solely with the purpose of handling a crowd quickly and without confusion and noise. It has been found expedient in such places to direct people in at one side of the desk, where books are returned, and out at the other side, where books are drawn.

In my opinion too little thought is given to planning the adult reading room. Location, light and general atmosphere are important considerations that a study of many buildings reveals as being determined carelessly. Economy of staff seems to have been the determining factor in placing it where it could be supervised from the loan desk. Its relation to the other units is not close. When it comes to studying the light problem in these rooms, most plans would suggest that any space readily accessible had been designated "reading room" and that ended it. Many rooms have a southern exposure with huge windows and even something similar to "French doors," with the resultant blinding glare. Some reading rooms in which wall shelving was necessary have been lighted by large windows chiefly on one side, and by small windows over the bookcases. A north light is good for a reading room, and this is excellent if it can be tempered with a northeast or a northwest exposure. It is a mistake to allow direct sunshine to fall on a reader or his book, and curtains and draperies should be used to soften the light when an ideal exposure cannot be had.

But what about atmosphere, book atmosphere or reading atmosphere, in the usual public library reading room? Many a one suggests so much the arrangement of a restaurant that it is only necessary to install a counter and serve food to complete the illusion. Intruding pillars with gaudy capitals and wall spaces filled with meaningless decoration have been employed until, it would seem, it had been entirely forgotten that books and book illustrations, maps and prints are the best of all decoration for a book room or a book house. And while atmosphere may be a matter of decoration and furnishings rather than plan, it is difficult to create the right atmosphere when the fault lies in the plan.

Some day a clever architect is going to do more than he appreciates for the cause of helping people to learn to read and to become book lovers by daring to create a public library reading room which is wholly a genuine reading room.



FIRST FLOOR PLAN BASEMENT FLOOR PLAN

Excellent features of this plan are adequate supervision and circulation of books and all business kept separate and distinct from the reference and study parts of the building. Stacks for storage are located in the basement and are not open to the public. Note the proportionate amount of space given to children and adult readers and the separate entrance for the younger people. Lecture room has separate entrance.

Floor Plans of Public Library, Waltham, Mass.
Loring & Leland, Architects

# BUSINESS & FINANCE

C. Stanley Taylor, *Editor*

## 1924—Another $5,000,000,000 Building Year

THE year 1923 has added to the history of building construction one of its most interesting chapters. The total investment in new building construction in 1923 was well over $5,000,000,000, and much of this expenditure represented better class buildings involving the use of architectural service.

In the last issue of THE ARCHITECTURAL FORUM, December, 1923, a review of construction activity during 1923 and the two preceding years was presented with graphic charts giving a comparison in money and volume of activity in seven types of building construction. On the second page of the Service Section in this issue it will be found that some of these graphic charts have been established as a permanent feature to indicate the monthly variation in totals of contracts let in the seven types of construction, including residential, commercial, industrial, hospital, school, church and recreational building.

At the present time interest naturally turns to a consideration of conditions which may be expected during the year 1924. The Research Department of THE FORUM has just completed the Annual Building Survey and Forecast for the year 1924 as based upon confidential reports received from 1,668 architects, listing projects now being planned or under serious consideration with clients. In January of 1922 and again in January of 1923 a similar Survey and Forecast was presented as based upon the reports of architects, and it is interesting to note that in both instances the actual figures justified the forecast figures in a surprisingly close manner.

The forecast for the year 1923, as published in January of that year, indicated a $5,000,000,000 building year and presented an allocation of activity in the various building types as established in the form of a percentage table covering the United States in six geographical divisions of the country. The actual figures for the year 1923 have been reported through several channels, and these statements and comparisons will serve to show how closely THE FORUM's forecast established a sound measure of the activity of the following year.

In the December 7, 1923, issue of The New York *Times* this item appeared:

"The end of 1923 will see a $5,000,000,000 building year in the United States, or an increase of 25 per cent in building over last year, when approximately $4,000,000,000 of construction was erected, according to estimates issued by S. W. Straus & Co."

On January 1, 1924, the Copper & Brass Research Association issued this statement:

"The Copper & Brass Research Association's annual survey of building construction, made public today, places the total expenditure during 1923 at $5,922,900,000; the largest single year in the history of the building industry, and bringing the total volume of construction for the past two years to the astounding total of $11,000,000,000.

"During 1923 the expenditure for residential buildings, including dwellings, apartments and hotels, amounted to $2,302,240,000, so that nearly 40 per cent of the total expenditure went to relieve the acute housing shortage which still existed at the beginning of the year. As a result of the past two years of record-breaking construction, the shortage in all classes of building brought about by the war has been steadily reduced. July 1, 1921, saw an estimated building shortage of $8,084,985,000, and construction during the remainder of that year reduced this figure to $6,363,835,000 on January 1, 1922. Construction in 1922 reached the total of $4,910,000,000, of which $3,125,000,000 represented the normal yearly demand for new construction, so that the shortage was relieved during 1922 by $1,785,000,000. Total construction of $5,922,900,000 during 1923 has contributed further to relieving this building shortage by a total of $2,617,900,000, leaving a shortage on January 1, 1924, of $1,960,935,000.

"The total expenditure for building construction during 1924 is estimated by the Copper & Brass Research Association at $4,835,935,000, of which amount $3,125,000,000 represents the expenditure necessary for normal building requirements:

| | | |
|---|---|---|
| July 1, 1921, estimated shortage............ | | $8,084,985,000 |
| Construction, balance of 1921............... | | 1,721,150,000 |
| Shortage, January 1, 1922.............. | | $6,363,835,000 |
| Construction in 1922......... | $4,910,000,000 | |
| Normal increment, 1922...... | 3,125,000,000 | |
| Shortage relieved in 1922.............. | | 1,785,000,000 |
| Shortage, January 1, 1923.............. | | $4,578,835,000 |
| Construction in 1923......... | $5,922,000,000 | |
| Normal increment, 1923...... | 3,305,000,000 | |
| Shortage relieved in 1923.............. | | 2,617,900,000 |
| Shortage, January 1, 1924.............. | | $1,960,935,000 |
| Normal increment, 1924...................... | | 3,125,000,000 |
| Total shortage ........................ | | $5,085,935,000 |
| Less carry over to 1924................ | | 250,000,000 |
| Construction in 1924................ ...... | | $4,835,935,000 |

This survey by the Copper & Brass Research Association is accompanied by a list showing percentages of activity in different classes of buildings. This list of percentages is presented here, together with the percentages from the 1923 forecast of The Architectural Forum which will serve to indicate how closely this type of forecast interprets future building activity.

### Forecast and Fact

In January, 1923, The Architectural Forum issued its Annual Building Survey and Forecast, *predicting* new building construction in the year 1923 as $5,116,544,000

In January, 1924, the Copper & Brass Research Association *reported* new building construction in the year 1923 as .................................. $5,922,900,000

Percentage Allocation of New Building in 1923

| Reported by Copper & Brass Research Association in Survey at end of year: | Per Cent | Forecast by Forum (Annual Building Survey and Forecast) at beginning of year: | Per Cent |
|---|---|---|---|
| Apartments | 16.00 | Apartments (including club bldgs.) | 18.4 |
| Churches | 6.77 | Churches | 6.4 |
| Dwellings | 12. | Dwellings | 9.2 |
| Banks (not classified) | | Banks | 3. |
| Hospitals | 7.6 | Hospitals (including welfare bldgs.) | 6.1 |
| Hotels | 10.87 | Hotels | 10.4 |
| Industrial | 12.63 | Industrial (including automotive) | 12.8 |
| Office Buildings | 10.26 | Office Buildings (including bank offices) | 13.3 |
| Public Buildings and Schools | 23.87 | Public Buildings and Schools | 23.4 |

On the third page of this article will be found a tabulation of the forecast for 1924 which shows over $5,500,000,000 to be invested in new building construction and promises that the year 1924 will be as active as the year 1923. For purposes of comparison, the figures for 1923 as presented in January of that year are given in a corresponding table. With this information comparisons may be made to determine which types of buildings will be more or less active than during last year.

### Building Material and Labor Costs

During the last three or four months of 1923 there was a seasonal recession in the cost of building materials, which if one refers to the chart on the first page of the Service Section in this issue will be found reflected in the falling line, indicating the cost of building. It is not anticipated that this decrease in the cost of construction will continue, as it is already being affected by a heavy and unexpected volume of winter building. In studying the chart referred to, it will also be noted that the line indicating plans filed (contemplated construction) has continued upward in November, promising a heavy volume of contracts to be let during the winter for spring construction.

All signs point to the fact that there will be an extremely heavy demand for building materials appearing unusually early in the year, and it is quite probable that with the letting of a great volume of contracts for spring building prices will increase again, and difficulty may be encountered in obtaining delivery of materials. In other words, it looks very much as though history would repeat itself in 1924 and that conditions will remain exactly similar to 1923 except that transportation facilities are somewhat better, and with a warning to speed up production, manufacturers may be in a better position to meet an unprecedented demand. It is probable also that a buyers' strike will again be threatened, and that the late spring will show a sharp falling off in a number of new contracts let. The so-called buyers' strike of 1923, which threatened much but did not develop, was prevented by the reestablishment of public confidence in the building situation, due to several factors which included the unshaken confidence of mortgage interests, the upholding of rental schedules, and the checking of building cost increases which in the late summer threatened a return to abnormal peaks.

The one condition which may possibly upset this forecast of an abnormally large volume of building construction during 1924 is this factor of public confidence. If building costs are driven too high, with the consequent withdrawal of large amounts of mortgage money, it may be that a buyers' strike which threatened in 1923 would become a fact in 1924. It is strongly advised, therefore, that wherever possible the undertaking of new building projects be put over until later than usual, and even deferred until the fall of 1924, so that the total volume of demand for materials and labor may be spread out in the hope of avoiding a critical condition in the early part of the year. It is also highly important that serious consideration be given to the possibilities of winter building,—either to start immediately or in the fall and winter of 1924.

In the Digest Section of this issue of The Forum will be found a number of interesting facts regarding the scientific development of winter building and the possibilities of cost saving and the economy which are offered. Building labor will evidently not be cheaper in 1924, and in fact may cost more.

The measure of prosperity in the building industry is closely related to general economic conditions throughout the country, and for this reason it is interesting to consider the opinions of leading economists not only in the building field but among bankers and commercial and industrial leaders. Recent forecasts made by banking organizations reflect sound optimism for the year 1924 and indicate that American industry faces an interesting prospective period of prosperity. No boom period is forecast, but a continuation of good business conditions with logical and sound expansion which will first appear in the early spring months. The National City Bank says that "as the year end approached, evidences have multiplied that instead of running into a quiet period the industries are likely to continue through the winter at a good rate of operations, and there is little doubt that spring will give a renewed stimulus to all activities."

# FORECAST OF NEW BUILDING CONSTRUCTION FOR 1924

Based upon actual figures obtained in the most comprehensive survey of projected building construction ever attempted in the construction industry. Full explanation will be found in accompanying text.

| BUILDING TYPES | N. EASTERN STATES | N. ATLANTIC STATES | S. EASTERN STATES | S. WESTERN STATES | MIDDLE STATES | WESTERN STATES | U. S. A. |
|---|---|---|---|---|---|---|---|
| Automotive | $18,736,400 | $47,916,700 | $4,002,100 | $8,878,400 | $52,991,400 | $13,798,100 | $146,323,100 |
| Banks | 29,871,600 | 76,083,300 | 7,052,500 | 6,844,800 | 65,406,900 | 15,906,100 | 201,165,200 |
| Apartments | 33,445,900 | 198,849,500 | 18,333,400 | 22,183,600 | 170,214,800 | 125,822,800 | 568,850,000 |
| Apartment Hotels | 30,783,000 | 94,441,500 | 4,609,700 | 4,185,000 | 184,211,300 | 39,137,500 | 357,368,000 |
| Clubs, Fraternal, etc. | 22,955,500 | 68,528,600 | 13,826,000 | 20,711,100 | 148,896,100 | 38,929,800 | 313,847,100 |
| Community, Memorial | 3,022,500 | 25,472,700 | 1,553,100 | 8,484,700 | 20,797,900 | 22,471,900 | 81,802,800 |
| Churches | 21,461,300 | 74,982,800 | 15,338,800 | 26,861,500 | 103,763,200 | 46,766,600 | 289,174,200 |
| Dwellings (Under $20,000) | 17,471,600 | 99,677,400 | 8,463,000 | 16,169,600 | 60,477,900 | 24,992,200 | 227,251,700 |
| " ($20,000 to $50,000) | 11,736,600 | 46,655,000 | 5,359,900 | 9,650,300 | 31,610,700 | 9,176,000 | 114,188,500 |
| " (Over $50,000) | 8,726,500 | 29,549,200 | 1,953,000 | 7,021,500 | 17,558,400 | 10,750,800 | 75,559,400 |
| Hotels | 26,021,400 | 150,362,400 | 52,855,000 | 65,320,100 | 254,240,300 | 86,595,400 | 635,394,600 |
| Hospitals | 14,464,600 | 90,619,200 | 7,765,500 | 26,669,300 | 135,612,600 | 36,037,500 | 311,168,700 |
| Industrial | 35,008,300 | 157,941,900 | 10,567,900 | 10,645,400 | 165,633,000 | 36,316,500 | 416,113,000 |
| Office Bldgs. | 19,291,300 | 109,848,500 | 15,934,000 | 53,850,100 | 200,120,500 | 105,052,800 | 504,097,200 |
| Public Bldgs. | 9,827,000 | 20,537,500 | 6,060,500 | 24,700,800 | 60,747,600 | 25,271,200 | 147,144,600 |
| Schools | 77,937,100 | 203,325,900 | 43,285,300 | 44,038,600 | 334,831,000 | 98,840,400 | 802,258,300 |
| Stores | 7,554,700 | 34,552,600 | 3,828,500 | 4,901,100 | 68,094,600 | 21,262,900 | 140,194,400 |
| Theaters | 30,209,500 | 29,192,700 | 2,055,300 | 18,848,000 | 81,003,000 | 18,513,200 | 179,821,700 |
| Welfare, Y.M.C.A., etc. | 4,371,000 | 11,801,700 | 1,038,500 | 6,169,000 | 13,748,500 | 11,516,500 | 48,645,200 |
| Total Value of New Buildings | $422,895,800 | $1,570,339,100 | $223,882,000 | $386,132,900 | $2,169,959,700 | $787,158,200 | $5,560,367,700 |

**Total Value of New Building in Forecast for 1924—$5,560,367,700**

AN interesting comparison and interpretation of the building outlook for 1924 may be had through a study of the figures presented in the tabulations on this page. It will be noted that the forecast figure for 1924 is over $500,000,000 greater than the forecast (and actual figure) for 1923. A full explanation of this forecast will be found in the accompanying article. These tables show for six geographical divisions the building types in which architects may expect activity.

## Forecast for 1923 as published in January, 1923, issue of THE ARCHITECTURAL FORUM

| BUILDING TYPES | N. EASTERN STATES | N. ATLANTIC STATES | S. EASTERN STATES | S. WESTERN STATES | MIDDLE STATES | WESTERN STATES | U. S. A. |
|---|---|---|---|---|---|---|---|
| Dwellings (Under 20,000) | $16,622,000 | $86,465,000 | $12,825,000 | $12,084,000 | $59,160,000 | $34,925,000 | $222,081,000 |
| " ($20,000 to $50,000) | 11,668,000 | 41,828,000 | 8,587,000 | 10,552,000 | 33,468,000 | 12,757,000 | 118,860,000 |
| " (Over 50,000) | 6,045,000 | 27,481,000 | 2,031,000 | 6,113,000 | 21,077,000 | 10,444,000 | 73,191,000 |
| Apartments | 56,020,000 | 237,296,000 | 25,392,000 | 34,323,000 | 229,552,000 | 80,302,000 | 662,885,000 |
| Hotels | 33,589,000 | 141,146,000 | 27,683,000 | 40,765,000 | 205,332,000 | 60,475,000 | 508,989,000 |
| Clubs, Fraternal, etc. | 15,888,000 | 58,221,000 | 13,268,000 | 28,784,000 | 109,700,000 | 50,406,000 | 276,266,000 |
| Churches | 17,577,000 | 128,120,000 | 15,128,000 | 25,519,000 | 82,903,000 | 43,688,000 | 312,936,000 |
| Community, Memorial | 14,620,000 | 27,401,000 | 1,950,000 | 6,209,000 | 46,509,000 | 21,099,000 | 117,788,000 |
| Welfare, Y.M.C.A., etc. | 3,295,000 | 15,702,000 | 2,576,000 | 3,302,000 | 15,680,000 | 9,688,000 | 50,242,000 |
| Hospitals | 13,594,000 | 54,166,000 | 6,972,000 | 27,438,000 | 105,096,000 | 52,148,000 | 259,414,000 |
| Office Bldgs. | 21,157,000 | 88,877,000 | 18,089,000 | 26,359,000 | 190,486,000 | 82,603,000 | 427,570,000 |
| Banks | 17,608,000 | 54,328,000 | 8,835,000 | 18,783,000 | 154,482,000 | 38,669,000 | 292,705,000 |
| Schools, Public Bldgs. | 65,159,000 | 158,165,000 | 41,515,000 | 31,930,000 | 383,036,000 | 190,228,000 | 870,034,000 |
| Theatres | 9,573,000 | 34,847,000 | 2,759,000 | 7,381,000 | 29,388,000 | 17,943,000 | 101,891,000 |
| Stores | 11,113,000 | 35,383,000 | 6,826,000 | 7,480,000 | 58,361,000 | 27,723,000 | 146,887,000 |
| Industrial | 29,859,000 | 162,762,000 | 38,824,000 | 25,231,000 | 241,871,000 | 49,488,000 | 548,037,000 |
| Automotive | 11,988,000 | 35,942,000 | 2,799,000 | 8,386,000 | 52,464,000 | 15,190,000 | 126,768,000 |
| Total Value of New Buildings | $355,375,000 | $1,388,130,000 | $236,059,000 | $320,639,000 | $2,018,565,000 | $797,776,000 | $5,116,544,000 |

Railroad expenditure in 1924 may slow down a bit, the review says, as the roads have placed their equipment in good shape, but "other construction work is likely to go forward on a scale little if any below that of 1923. The issues of building permits in recent months indicate that such operations will be up to the capacity of the building trades." Another important business asset of the nation has been the development of the use of electricity. As for the automobile industry, the review suggests that "the outlook at this time, judging by the reports received by the principal producers from their agencies, is for the maintenance of this (the 1923) volume of sales in the ensuing year."

In its study of business conditions the Mechanics and Metals National Bank finds that "reasons for optimism are well founded," and that the "factors which are operating most positively in favor of the country are of course the energy and ability of the American people and their extraordinary facility for production and distribution." A number of problems before the country are enumerated, among them "the unreasonably burdensome scale of national, state and municipal taxes, the hostile attitude of certain groups of politicians to corporate interests, and the insistence upon extending Government help where it should not go."

Francis H. Sisson, Vice-president of the Guaranty Trust Company of New York, believes that business will steer a safe, middle course in 1924 as indicated by his statement: "The bearing upon the future course of business of the adverse conditions prevailing, such as disproportionately high production costs here and there and unduly low prices for some commodities, should not be ignored. But these conditions are not new. They obtain always in some measure. Besides, in recent months a significant degree of correction of such conditions has been effected, and meanwhile they have not prevented a continuance of prosperity. With due allowance for further necessary readjustments, both in prices and in production, the general business outlook for 1924 is favorable. Neither an approaching boom nor a general depression is now indicated, but rather the continuance of a more wholesome middle course."

E. G. Grace, President of the Bethlehem Steel Corporation, makes the statement: "On the whole, however, the year is starting with so many favorable earmarks that the adverse political possibilities can, to a certain extent, be ignored when we consider their improbability of realization. It must be remembered that the country, as a whole, is in a much better frame of mind than that which prevailed at the middle of last year, when there was talk of another serious readjustment such as that of 1920. Buyers are more confident in arranging for future commitments, and even though some lines of industry are not prosperous, the country as a whole is in a favorable position."

From the viewpoint of architects 1924 should prove to be an exceptionally good year except in those districts affected by adverse business conditions and where little activity is reflected in the accompanying survey. A review of the individual reports which have been received in the office of THE ARCHITECTURAL FORUM indicates that the average building project is somewhat larger than in 1923 and that the average character of proposed new buildings is somewhat better, requiring even more specifically the service of architects.

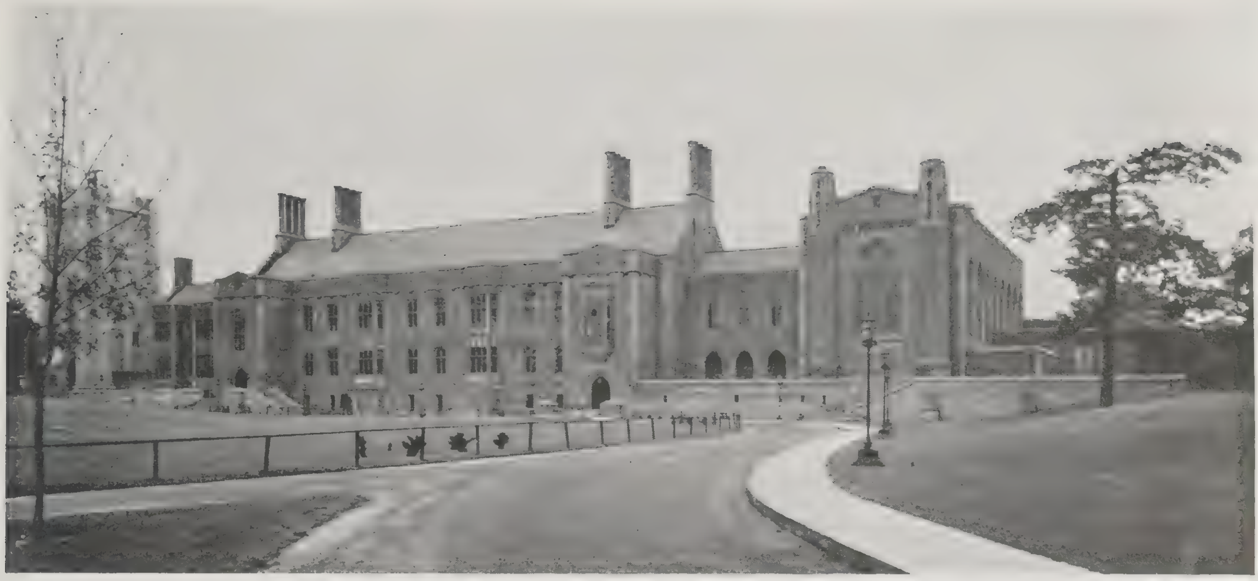
Appreciation of the economic value of architectural service is growing rapidly and spreading not only among the investing public but through specific business groups, including bankers and owners of buildings of special types. The average architect is learning to definitely develop the economic phases of his service. He is learning to analyze his client's building problem from the viewpoints of promotion, financing and investment, and consequently his plans are being more specifically adapted to the evident purposes of the structure.

It is quite obvious also that the architect who is able to impress an owner with his general knowledge of local real estate and business conditions and who can assist the owner in solving his problem is certain to have a busy office when others who merely provide what the owner asks are not developing the type of good will which goes with the broader form of service. There has never been a time when the architect's position has been more important in the community, and it is very definitely his responsibility to influence the wise expenditure of time and money in new building projects. It must be remembered that every building which is successfully planned encourages the building of additional structures, and that the difference between economic waste and efficiency in the field of building construction lies primarily in careful planning to meet established objectives.

## Features of The Forum's Service Section

The Service Section of THE ARCHITECTURAL FORUM is located in the yellow pages toward the back of the magazine. Here will be found a monthly review of the building situation, and on the second page a new feature begins this month which is a record of activity in each of seven basic types of building construction. The personnel and purpose of the Consultation Committee is explained in this section, following which there will be found a careful digest of information important to the architect as selected from publications in other fields.

To read the Service Section each month is to know the general building situation, and it affords an excellent source of information for use in discussions with clients.



# Hart House, University of Toronto

SPROATT & ROLPH, ARCHITECTS

*By* J. B. BICKERSTETH, *Warden of Hart House*

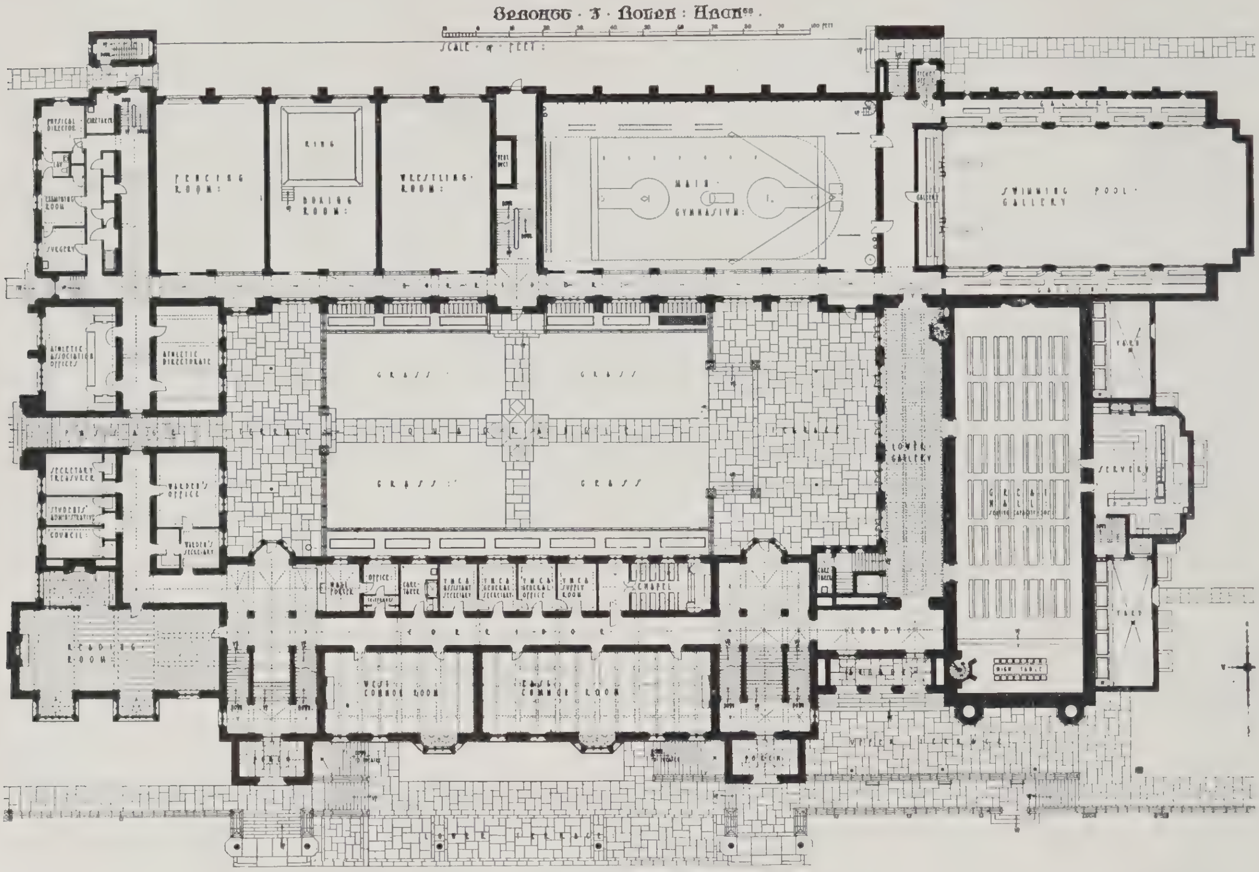
HART HOUSE is so called in memory of the late Hart Massey. Begun in 1911, it was completed in 1919 and presented, fully equipped, to the University of Toronto by the trustees of the Massey Foundation. To Vincent Massey, Vice-chairman of the Massey Foundation, is due the idea of Hart House as well as the form it assumed under his personal supervision. Owing to the war the building developed slowly, but the enforced delay of five years, during which time construction was reduced to a minimum, afforded valuable opportunity for widening the scope of its activities.

From the autumn of 1914 until November, 1918, it was used for military purposes, and within its walls thousands of men were trained for service overseas. On the first anniversary of the Armistice—November 11, 1919—Hart House was formally opened by His Excellency, the Duke of Devonshire, who was at that time the Governor-general of Canada. The architects of the building were Henry Sproatt and Ernest Rolph of Toronto. Their object was the creation of a work of art in the true sense, but they never failed to strike a fine balance between beauty of design and utility of purpose. Owing to the generosity of the Massey Foundation, the vision of Vincent Massey and the skill of the architects, there is no question that the University of Toronto possesses a building which comes as near to meeting the requirements of the ideal house for student activities as any on this continent or perhaps in the world.

In its widest interpretation, Hart House, which is for the use of men and is non-residential, seeks to provide for all the activities of the undergraduate's life which lie outside the actual lecture rooms. Architecturally of great beauty and built round a quadrangle, Hart House is unique in that it houses under one roof a finely proportioned hall, common rooms of every description, a library, lecture room, music room, a small chapel together with rooms for the use of the Student Christian Association, a studio for painting and sketching, photographic dark rooms, billiard room, senior common rooms and dining rooms for both faculty and graduate members, an upper and lower gymnasium, both admirably equipped, separate rooms for boxing, wrestling and fencing, an indoor running track, a large swimming pool, racquet courts, an indoor rifle range, extensive locker rooms, offices for the athletic and medical staff, a few bedrooms for guests, and the office and private rooms of the warden. Below the quadrangle is a fully equipped theater with foyer, green room, dressing rooms, wardrobe, and the office of the director of the theater.

Every male undergraduate of the university is required to be a member of Hart House, toward the upkeep of which he pays a moderate annual fee. At the moment there are some 3,600 undergraduate members. The graduates or alumni, of whom there are about 400 members, also pay an annual fee, as do faculty members, numbering some 250. The house has no endowment, and these fees are its chief source of revenue. To the warden, who is directly responsible to the president of the university, is entrusted the general supervision of the whole house, but to a large extent it is managed by the students themselves. At least 80 men, annually elected by their fellows, serve on the various committees.

What was it the Founders had in mind when they caused Hart House to be built? Perhaps this question may be best answered by quoting in full the Prayer of the Founders, which is "That Hart



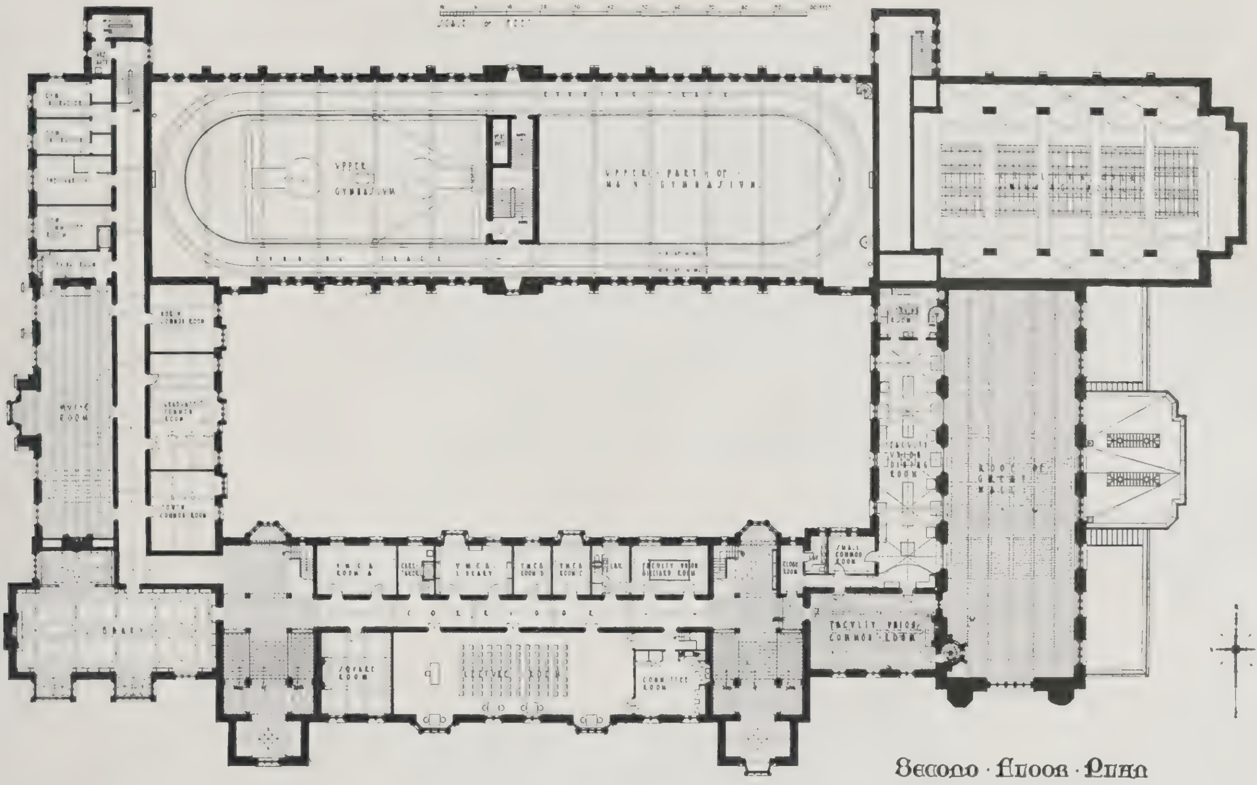
First Floor Plan

House, under the guidance of its warden, may serve, in the generations to come, the highest interests of this university by drawing into a common fellowship the members of the several colleges and faculties, and by gathering into a true society the teacher and the student, the graduate and the undergraduate; further, that the members of Hart House may discover within its walls the true education that is to be found in good fellowship, in friendly disputation and debate, in the conversation of wise and earnest men, in music, pictures and the play, in the casual book, in sports and games and the mastery of the body; and lastly, that just as in the days of war, this house was devoted to the training in arms of the young soldier, so in the time of peace its halls may be dedicated to the task of arming youth with strength and suppleness of limb, with clarity of mind and depth of understanding, and with a spirit of true religion and high endeavor."

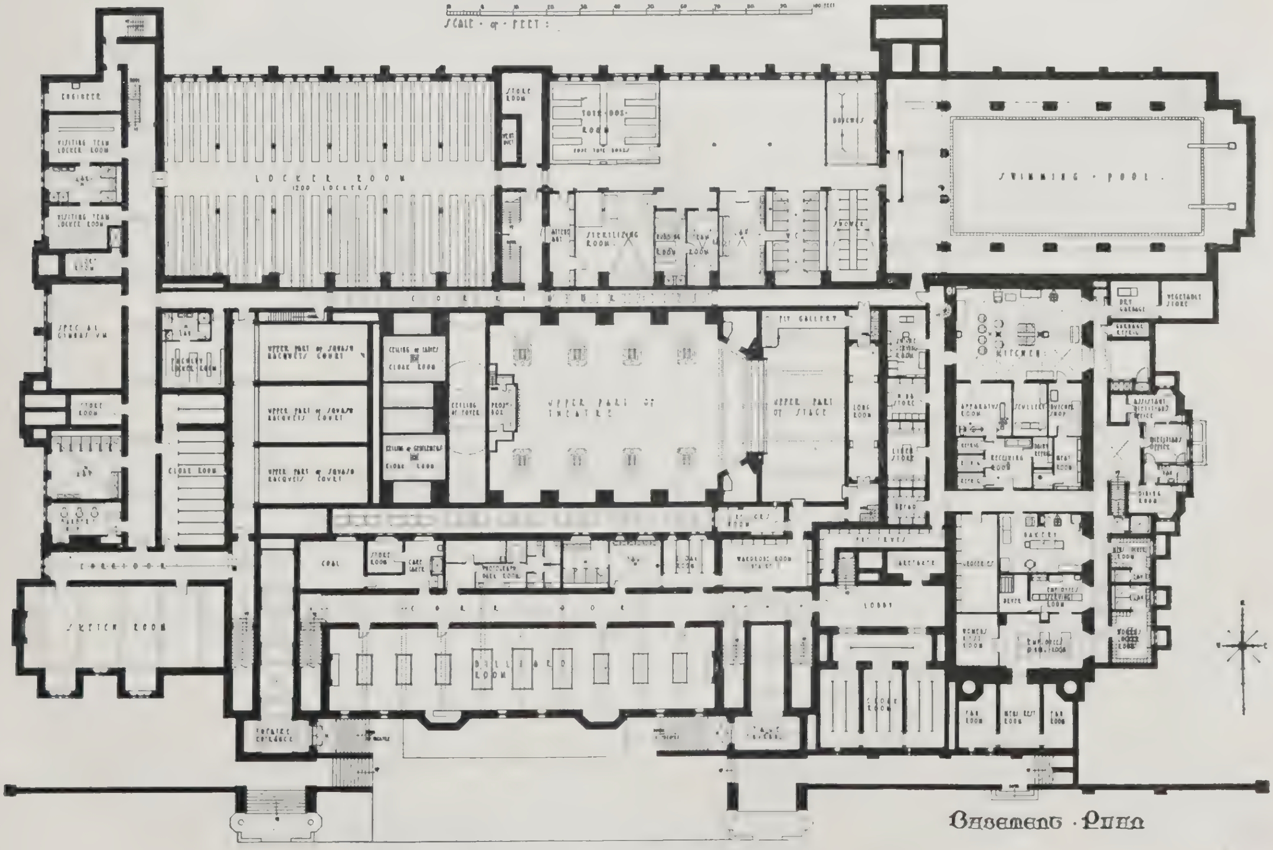
The object of the Founders, then, was to erect a building which should not only pay adequate attention to the material comfort of the student but should also make full provision in the widest sense of the word for his spiritual development. How far is Hart House, after four years of existence, fulfilling these ideals? In the great hall, which is as beautiful as the hall of any Oxford or Cambridge college, meals are served to the students at a moderate cost throughout the academic year. At the south end of the hall above the high table the oak panels bear the royal arms and the arms of 51 universities of the British Empire. At the north end the panels bear the arms of 74 universities of the allied nations—France, Belgium, the United States of America, Italy, Russia, Japan, Serbia, Roumania, Portugal and Greece. The use of this hall as a dining room brings the student daily under the influence of its beauty, which would have been impossible had it been reserved for special occasions.

The reading room, the library and the various common rooms, all of which are most comfortably furnished, are thronged daily with hundreds of students. Indeed the use made of Hart House by all members of the university—undergraduate, graduate, and faculty—increases with each succeeding year, and it is becoming more and more a meeting place for students of different faculties, colleges and years. The gymnasium wing, including the swimming pool, is in daily use for the physical training required by the university of all first and second year men, and in the afternoon this part of the building is in great demand by men engaged in every kind of indoor sport.

An interesting development in the musical activities of the house has been the inauguration last year of a series of Sunday concerts in the great hall. These concerts have been held every third Sunday evening, between the hours of 9 and 10, and the leading professional musicians of Toronto have given their services free. During full term time

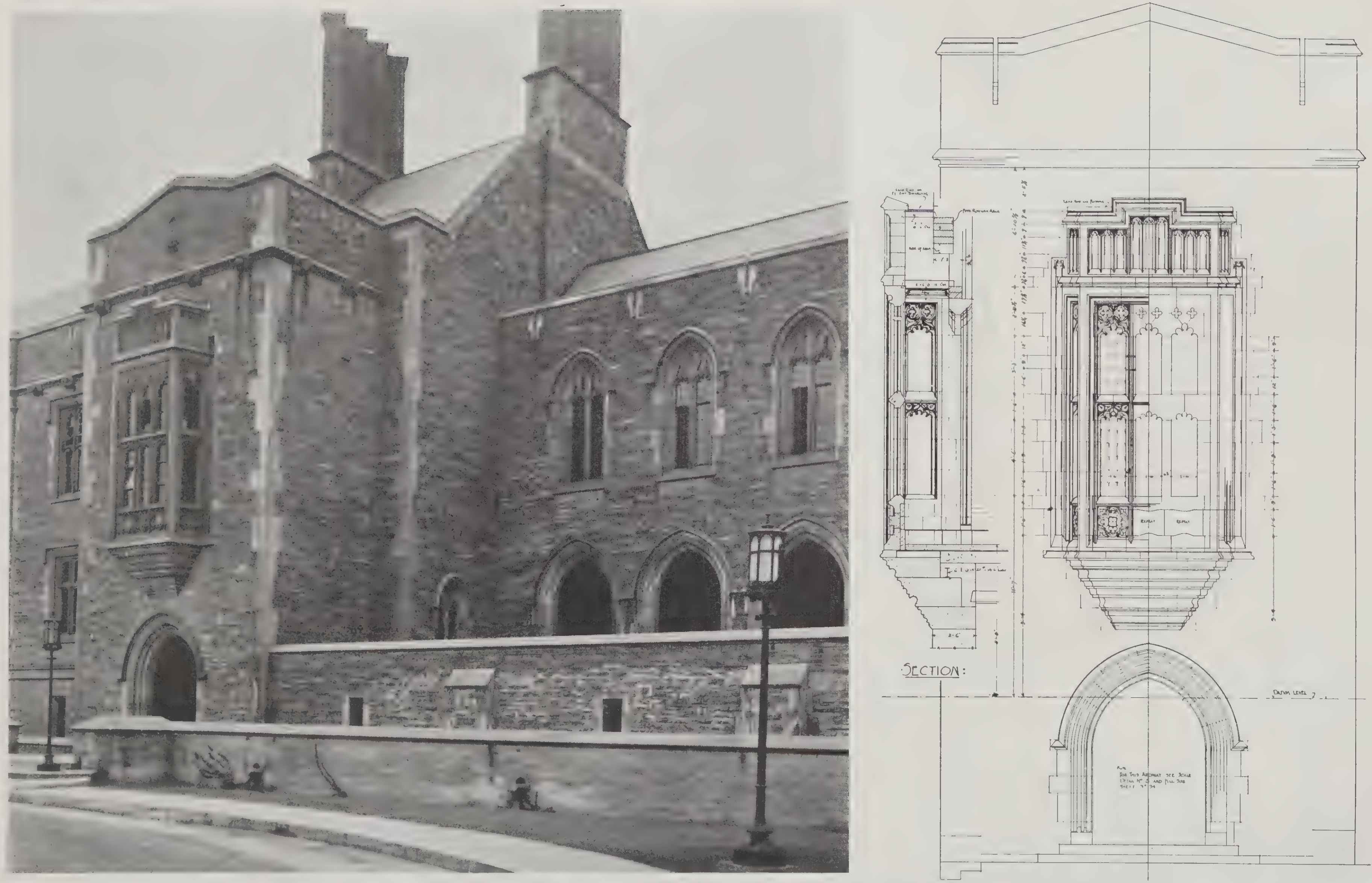


Hart · House : University · of · Toronto
Sproatt · & · Rolph : Archts :



HART HOUSE, UNIVERSITY OF TORONTO, TORONTO

SPROATT & ROLPH, ARCHITECTS



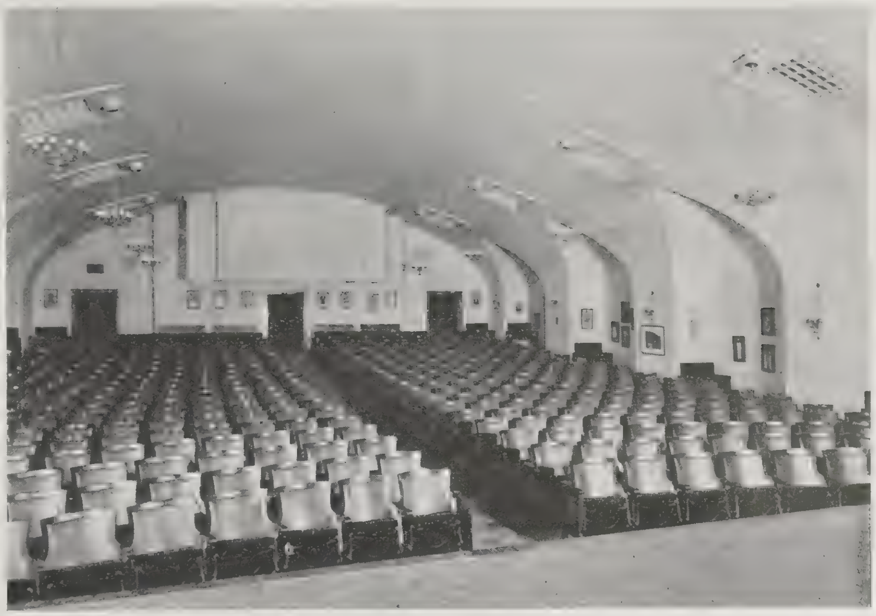
DETAILS OF EAST ENTRANCE ON SOUTH FRONT, HART HOUSE, UNIVERSITY OF TORONTO

SPROATT & ROLPH, ARCHITECTS

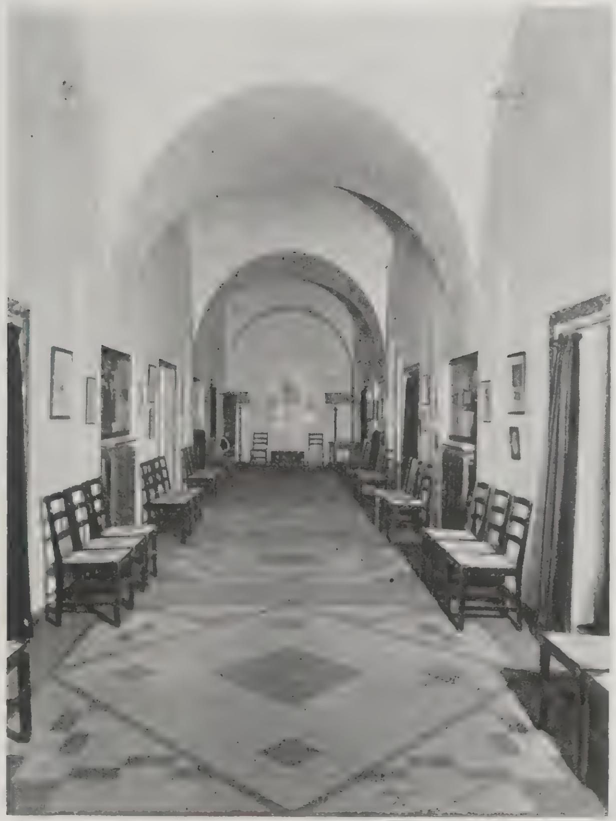
recitals are held in the music room every Friday at 5, when professional musicians from Toronto again give their services, and the attendance is very large.

The activities centering around the sketch room, equipped for drawing and painting, are playing an increasingly important part in the life of the house. Every month an exhibition of paintings is held, sometimes the work of some Toronto artist, or it may be a collection of Japanese prints or Cézanne drawings. In connection with the exhibition, which lasts a week, a lecture always takes place either with particular reference to the pictures then on the walls, or on some general aspect of art. On one evening a week lessons in sketching and painting are given by one of the best known of the Toronto artists. The camera club, which is an active organization, possessing fully equipped dark rooms within the house, holds an annual exhibition in the sketch room.

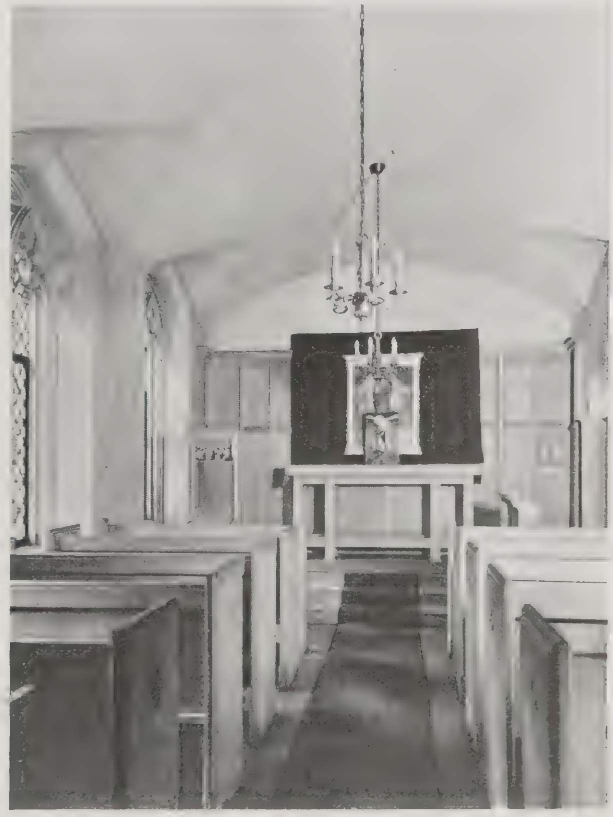
The religious life of the house centers around the work of the Student Christian Association. The chief function of this association is the promotion of all purely religious activities among the students, and owing to the fact that when the house was being planned the Founders made provision for offices which should be occupied by the men's religious organization, this important side of university life has not been divorced from other student activities. The little chapel, which is of great beauty, is used from time to time for informal services and also for



Interior of Theater, from Stage



Theater Foyer



Interior of Chapel

Hart House, University of Toronto

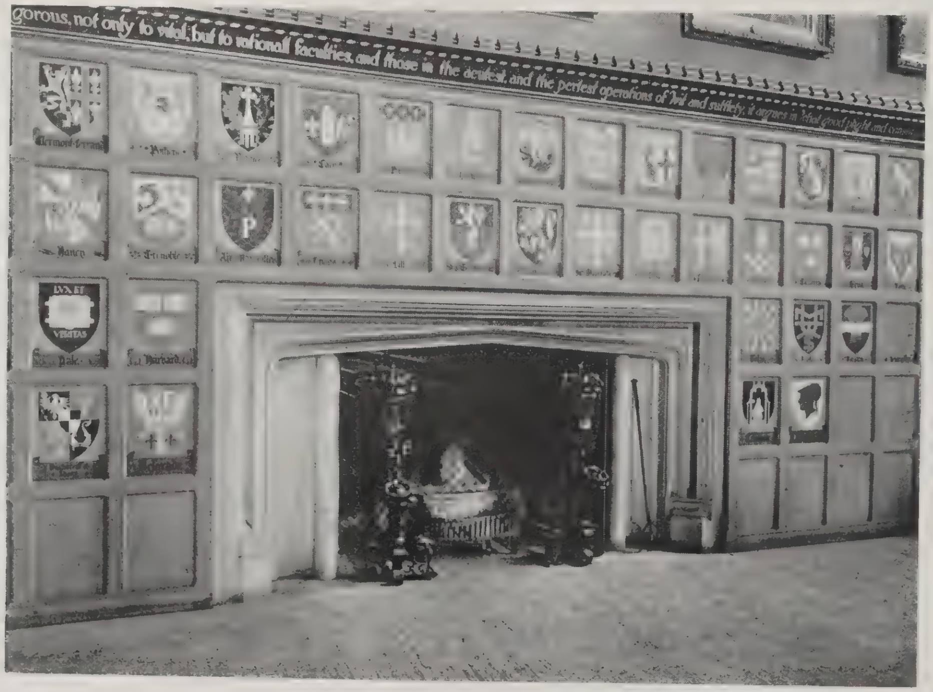
private prayer. The glass in the windows was collected from the devastated areas of France, Flanders and Italy, while over the altar is a Crucifix carved by Eric Gill, the well known English sculptor.

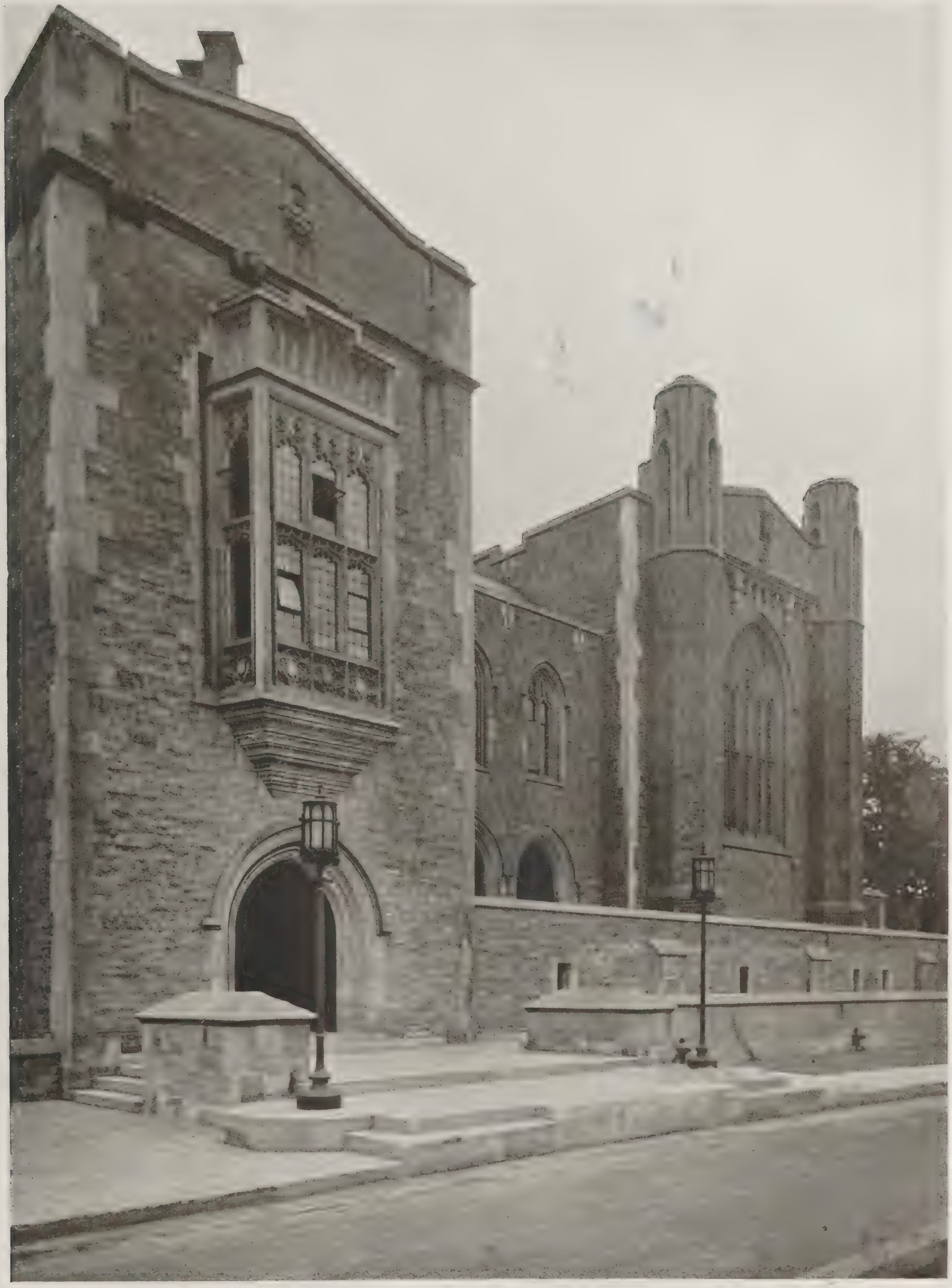
Hart House Theater, cleverly constructed under the quadrangle, seats 500 people. It is reached through separate outside entrances and a foyer. The lighting and mechanical equipment are probably unequaled in any theater of this size. The Director of Hart House Theater, Bertram Forsyth, is responsible for the production of all plays, a different play being acted throughout one week (seven performances) in each month of the academic year. The actors and stage crew are all amateurs, the actors being drawn partly from students and faculty and partly from groups of people in the city who are interested in the little theater movement.

Swimming Pool

The rubble walls of Hart House are built of a local gray sandstone. The cut stone is gray Indiana limestone. The roof is covered with extra heavy Bangor green slate, the window sash are steel made in England, and terrace flagging, walks, etc., are of gray Ohio stone.

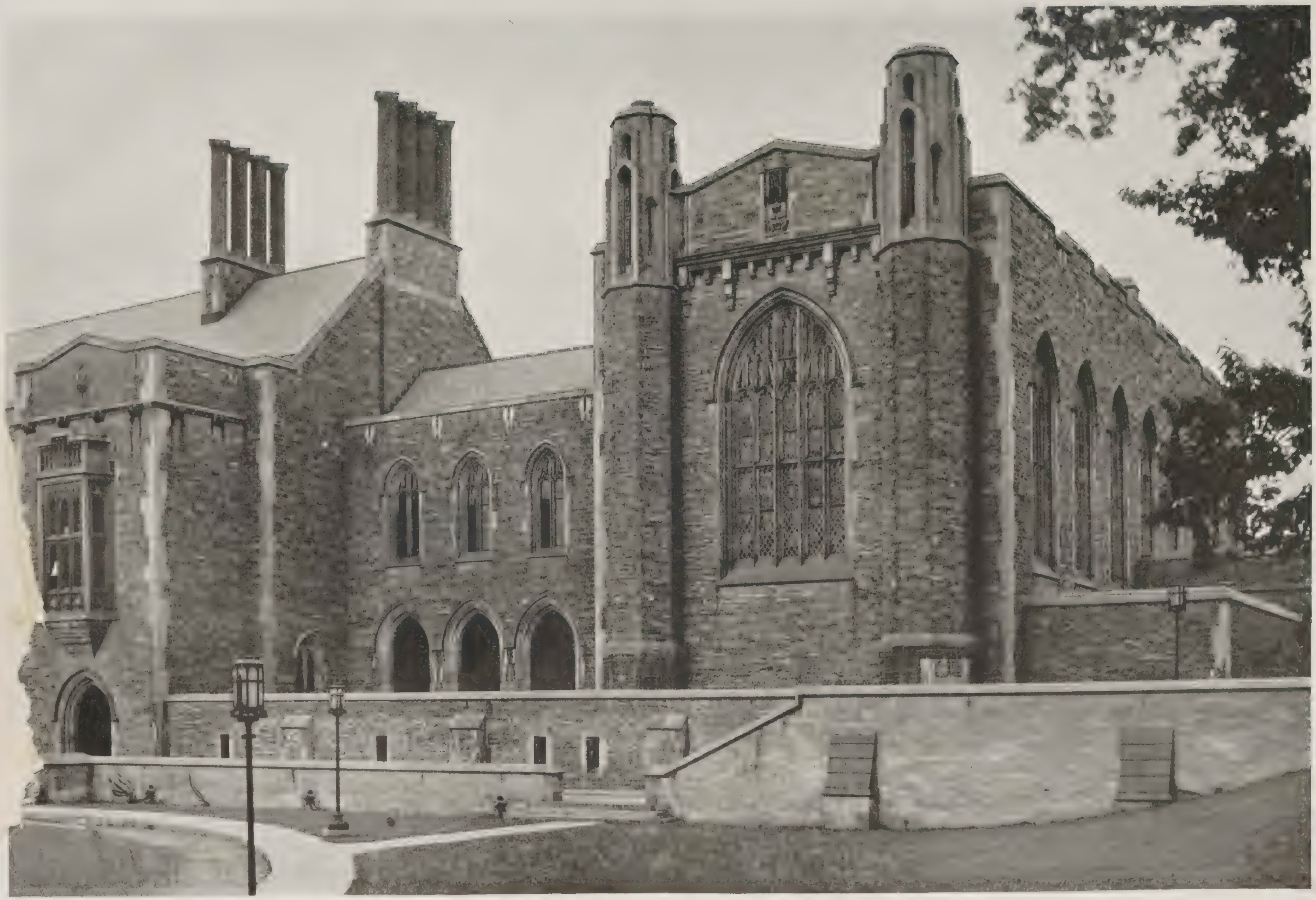
The interior is devoid of elaboration and very simply finished throughout, with the exception of a few of the principal rooms. The great hall has an open timbered roof of American oak. The paneling of Austrian oak is carried up about 13 feet to the stone sills of the mullioned windows. The floor is paved with Italian travertine, as also are all corridors and halls throughout the building, with the exception of the gymnasium section. The faculty common room and the large lecture room and music room have open timbered roofs, the first two of oak and the music room of Pacific coast cedar. The oak floors throughout the house are laid of boards from 4 to 8 inches in width and have stood the change of seasons well. Oak work, timbered roofs, doors, etc., are left in the natural wood without filling or stain. All inside door and window openings throughout the building have moulded stone jambs and heads, no wooden architraves or bases being used except in a few of the minor offices, the use of wood being largely avoided for trim.


gorous, not only to vital, but to rationall faculties, and those in the acutest, and the perfect operations of wit and subtlety, it engages in that good plight and
Clermont-Ferrand
Nancy
LVX ET VERITAS
Yale
Harvard
Detail of Fireplace at End of Great Hall Showing the Arms of the Universities of the Allied Nations

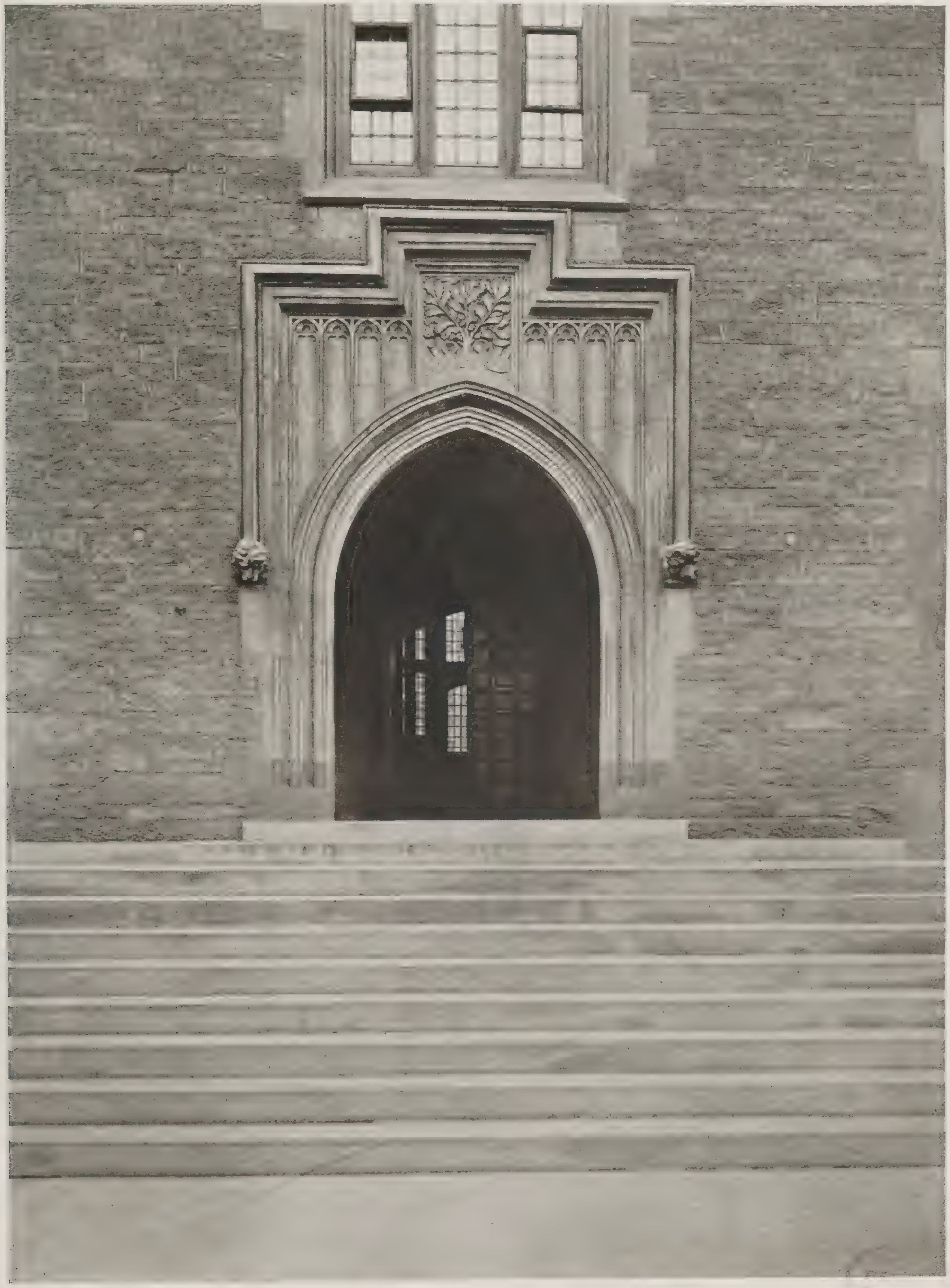


DETAIL OF EAST ENTRANCE ON SOUTH FRONT
HART HOUSE, UNIVERSITY OF TORONTO, TORONTO
SPROATT & ROLPH, ARCHITECTS

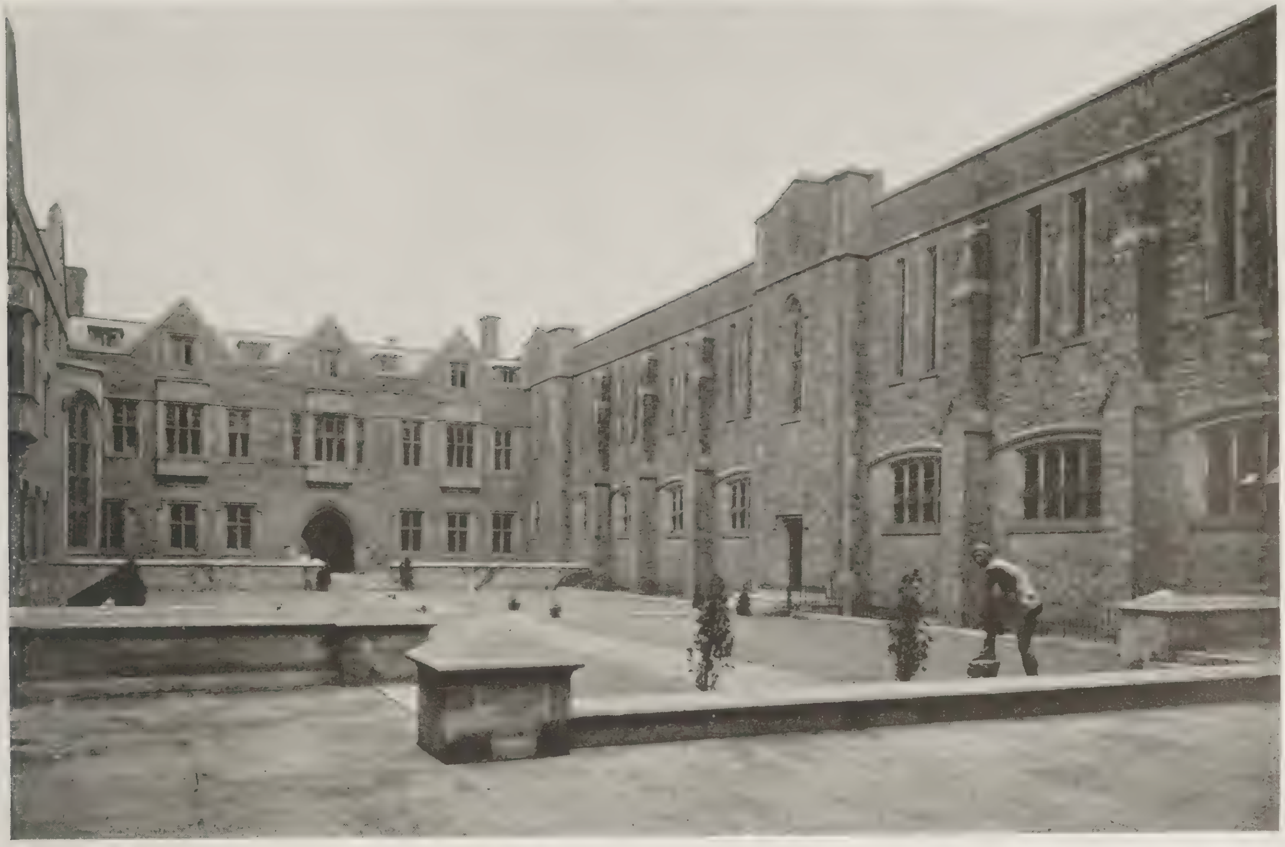
*Photos. Paul J. Weber*



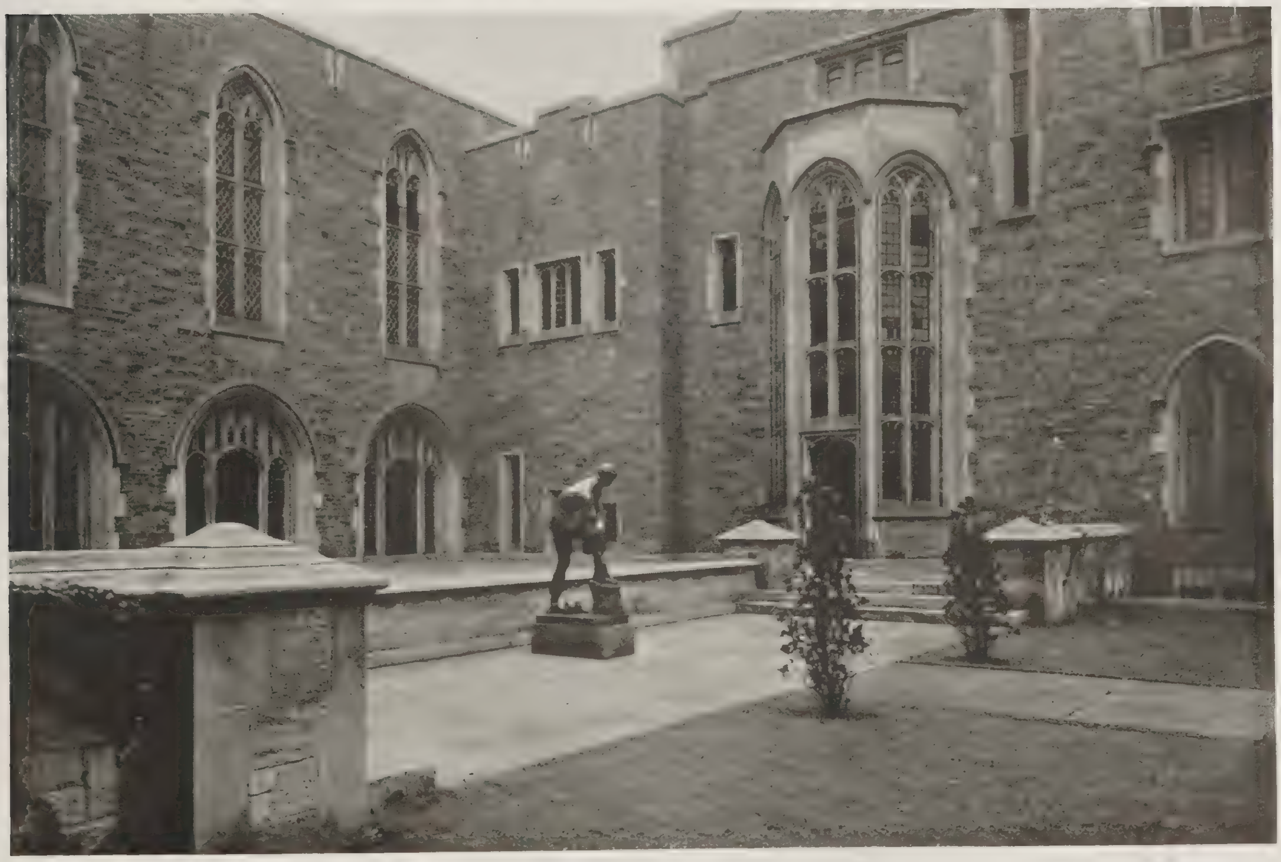
EASTERN END OF BUILDING FROM APPROACH
HART HOUSE, UNIVERSITY OF TORONTO, TORONTO
SPROATT & ROLPH, ARCHITECTS



DETAIL OF WEST ENTRANCE ON SOUTH FRONT
HART HOUSE, UNIVERSITY OF TORONTO, TORONTO
SPROATT & ROLPH, ARCHITECTS



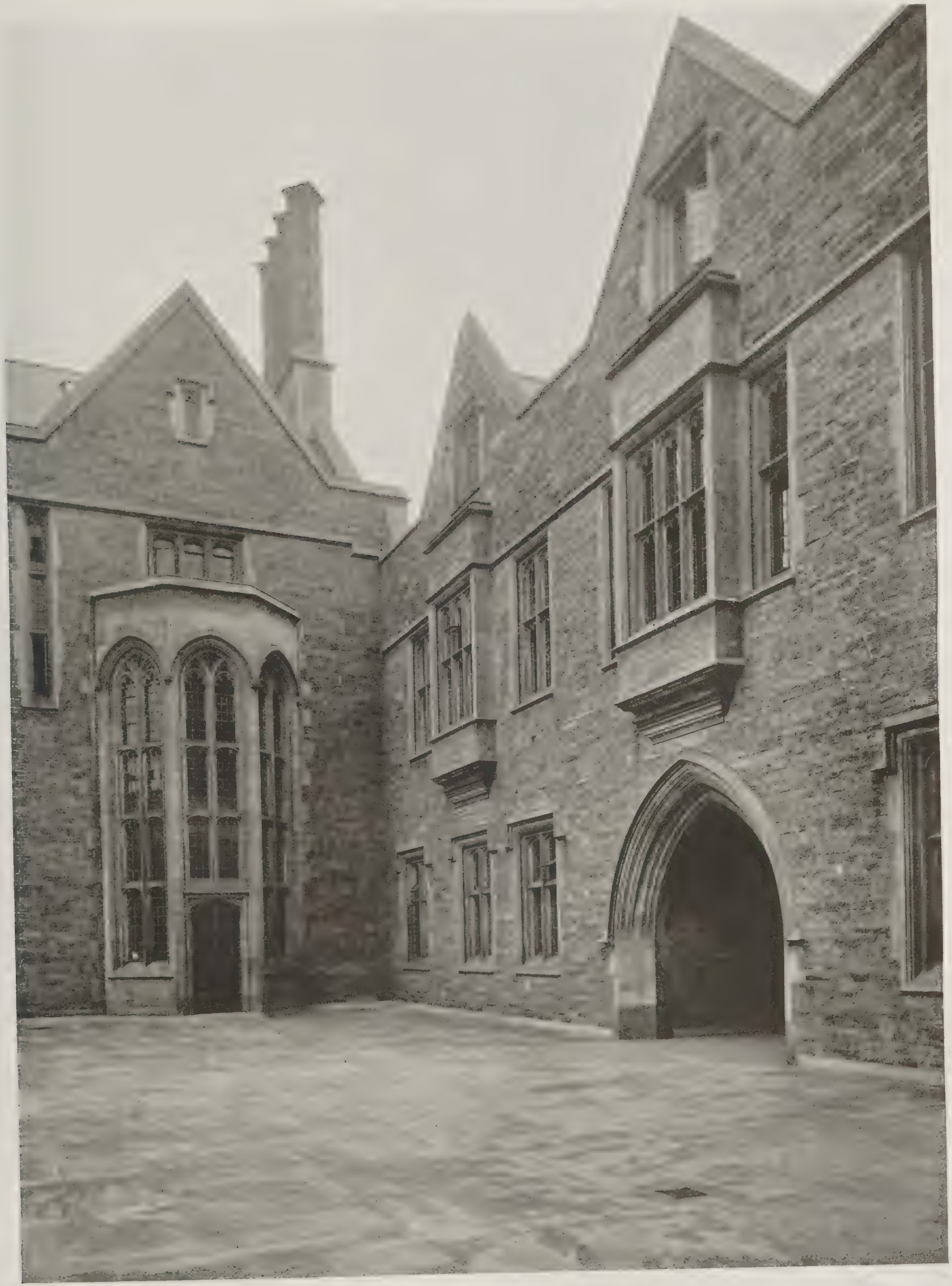
VIEW IN QUADRANGLE LOOKING WEST



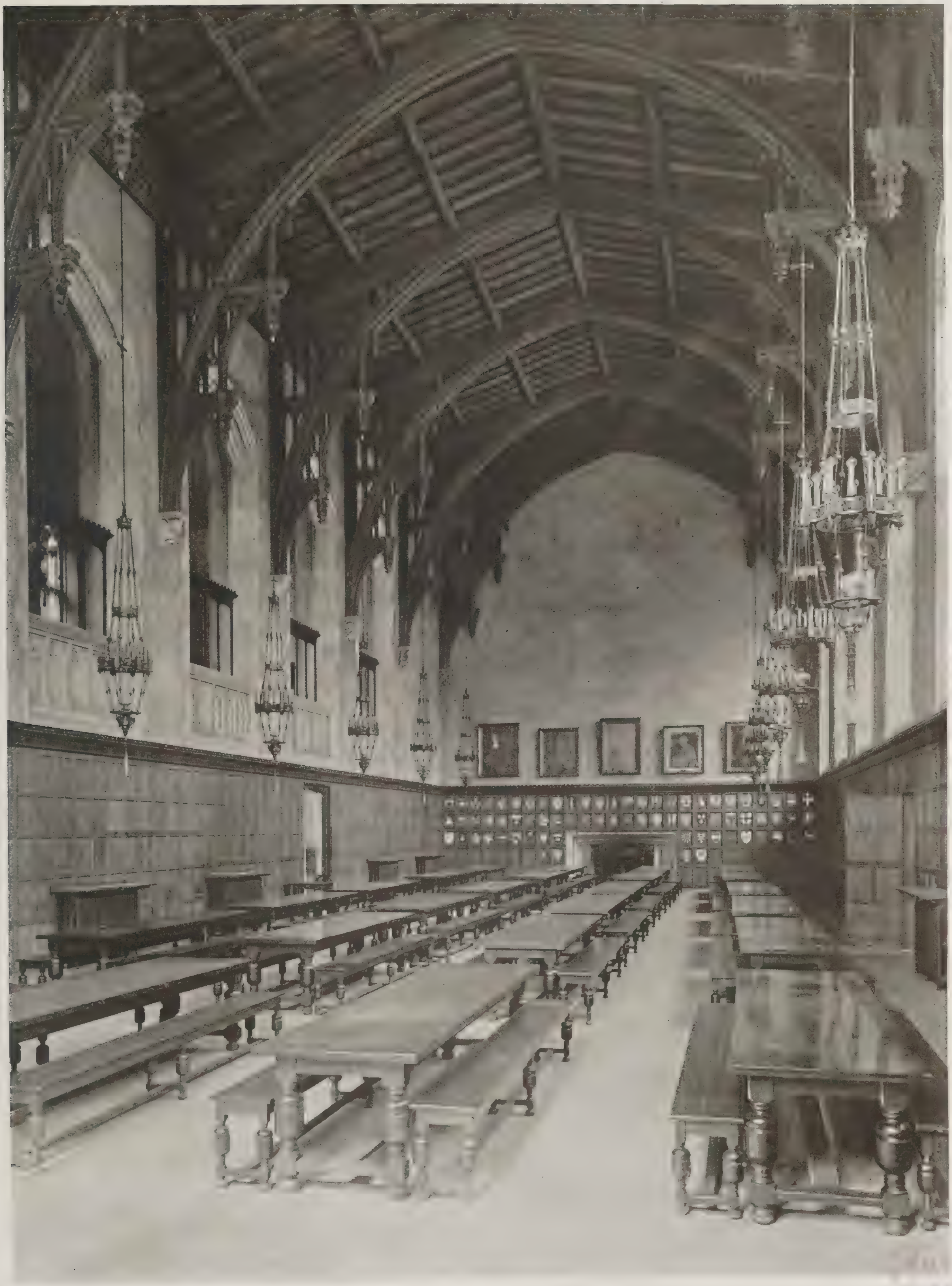
TERRACE AT EASTERN END OF QUADRANGLE

HART HOUSE, UNIVERSITY OF TORONTO, TORONTO

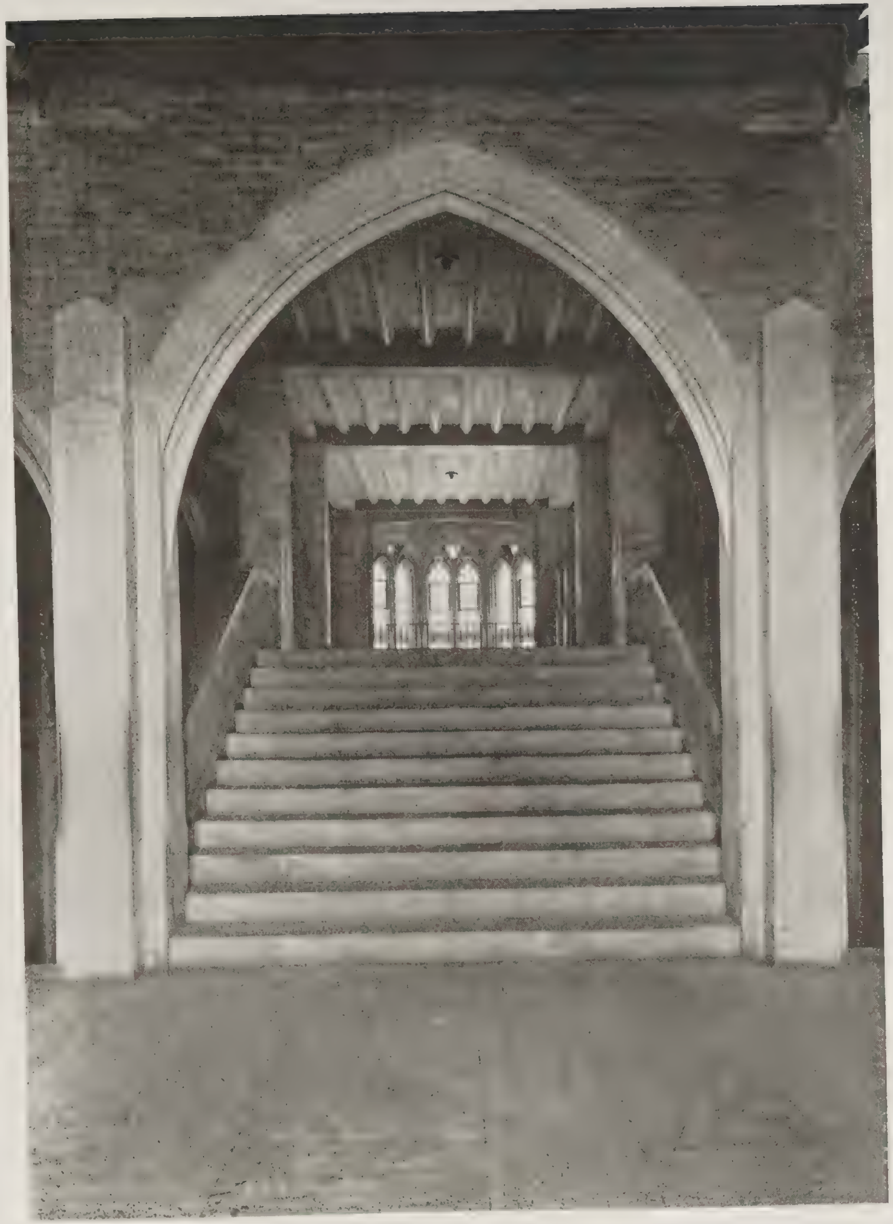
SPROATT & ROLPH, ARCHITECTS



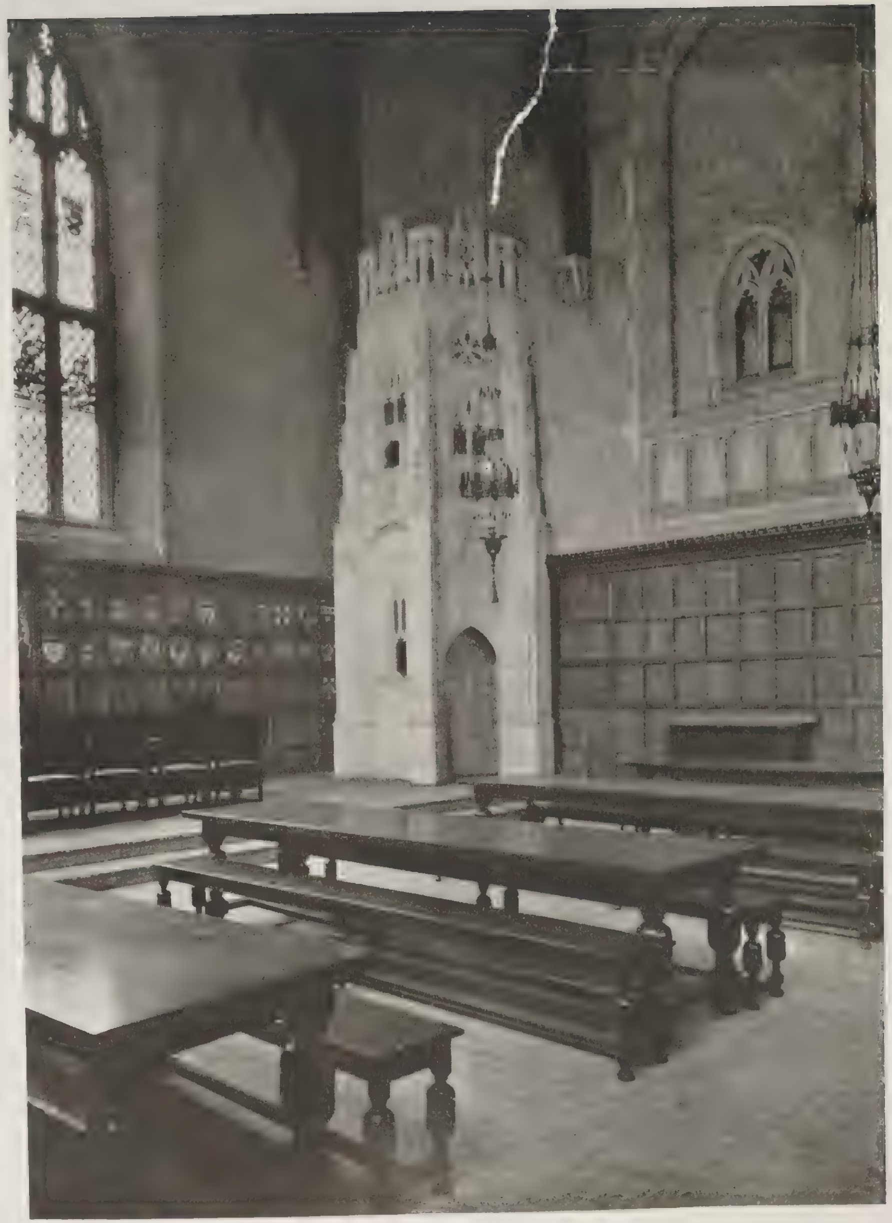
DETAIL AT WEST END OF QUADRANGLE
HART HOUSE, UNIVERSITY OF TORONTO, TORONTO
SPROATT & ROLPH, ARCHITECTS



THE GREAT HALL LOOKING NORTH
HART HOUSE, UNIVERSITY OF TORONTO, TORONTO
SPROATT & ROLPH, ARCHITECTS



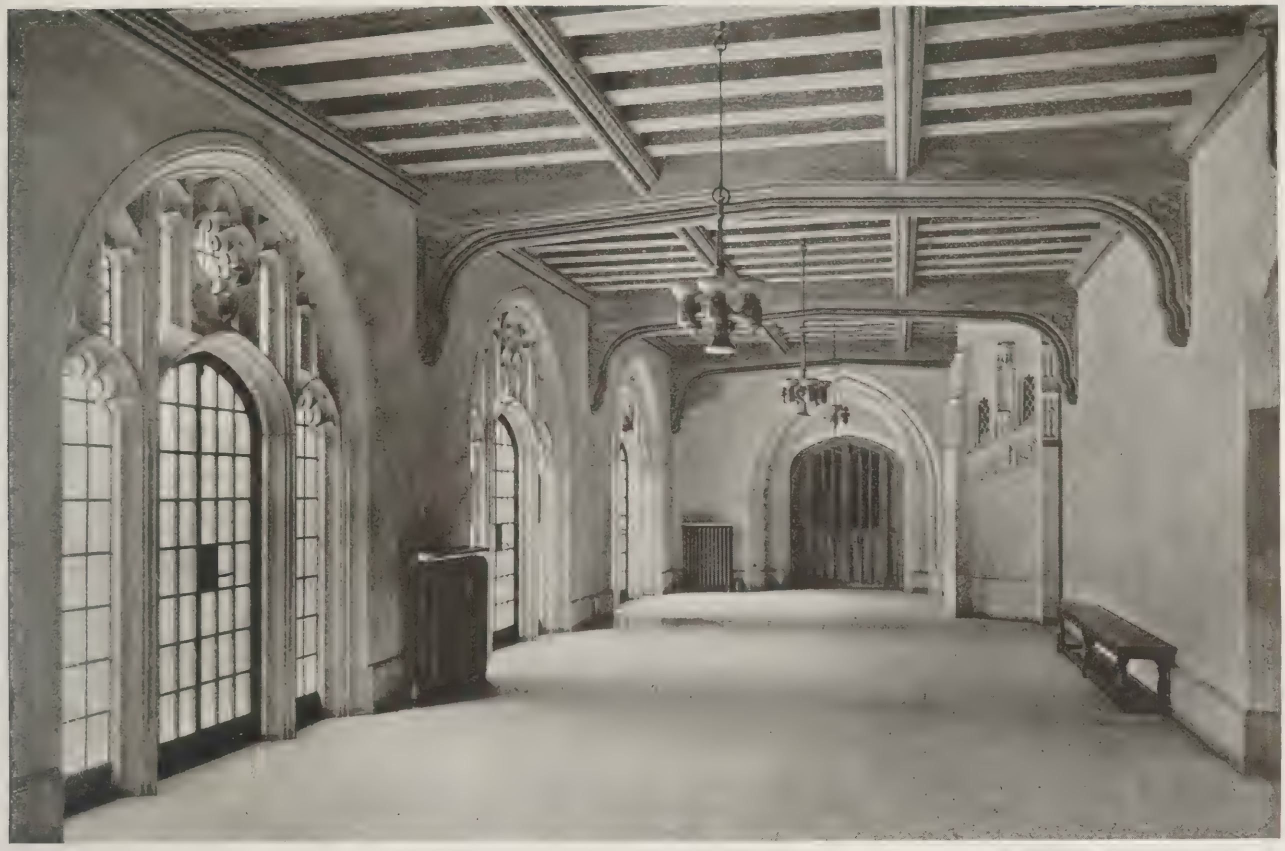
VESTIBULE OF ENTRANCE ON SOUTH FRONT



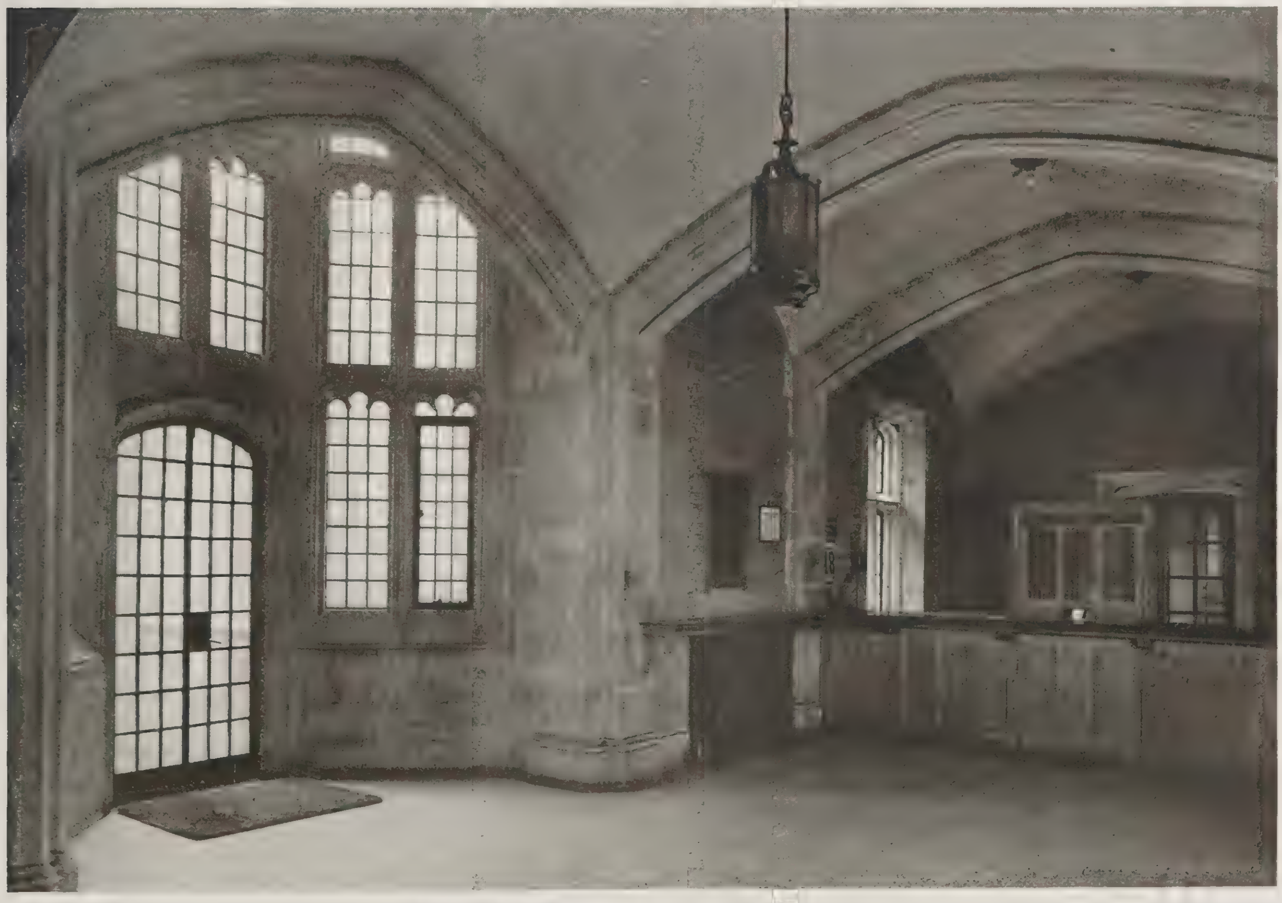
HIGH TABLE END OF GREAT HALL

HART HOUSE, UNIVERSITY OF TORONTO, TORONTO

SPROATT & ROLPH, ARCHITECTS



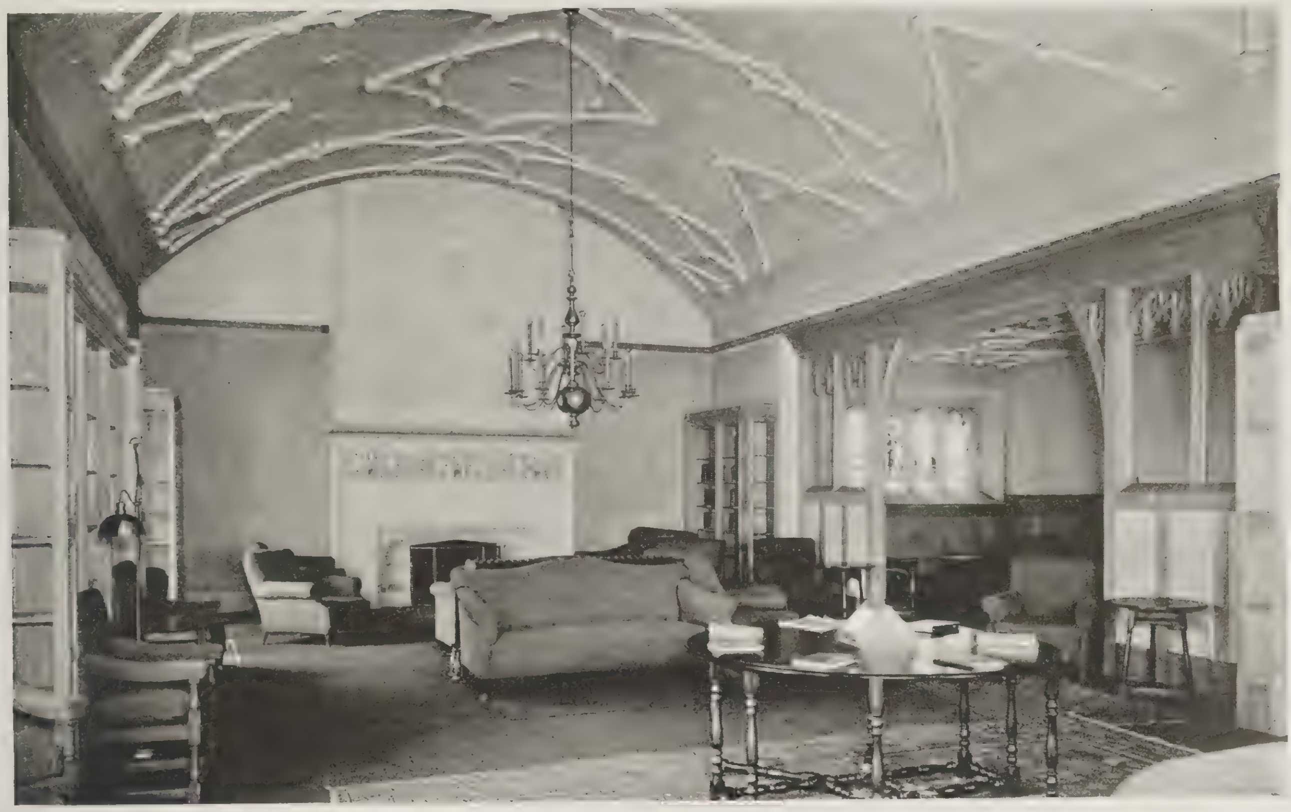
LOWER GALLERY ADJOINING GREAT HALL



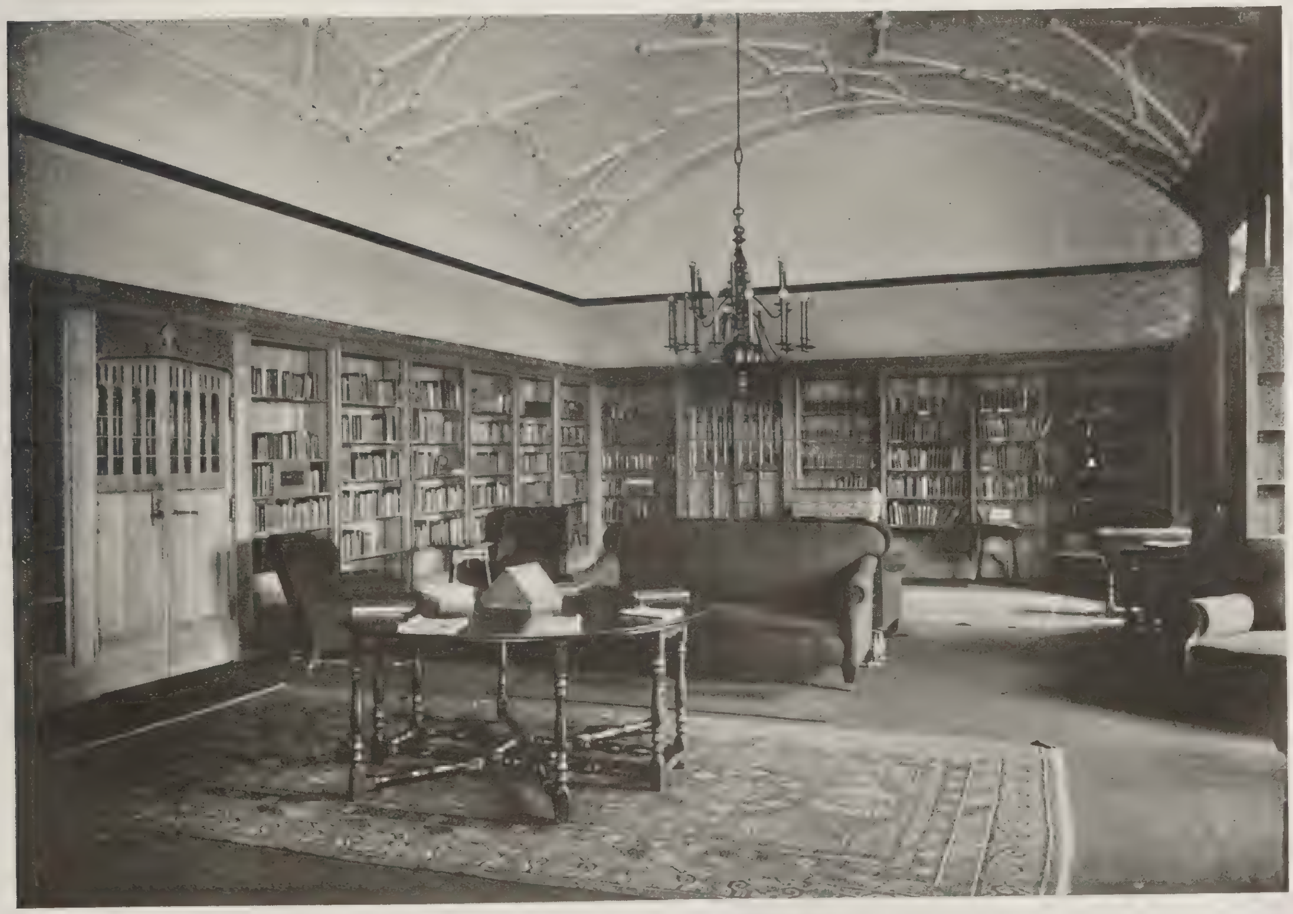
LOBBY LOOKING TOWARDS PORTER'S DESK

HART HOUSE, UNIVERSITY OF TORONTO, TORONTO

SPROATT & ROLPH, ARCHITECTS



FIREPLACE END OF READING ROOM



LIBRARY END OF READING ROOM

HART HOUSE, UNIVERSITY OF TORONTO, TORONTO

SPROATT & ROLPH, ARCHITECTS

# Mosaics in the Church of San Marco, Rome

*By* ALFRED MAUSOLFF

*Accompanied by Measured Drawings by the Author*

NOT the least of the details which render glorious the old cathedrals and churches of Italy are the floors of mosaic of different kinds, the making of which constitutes an art which has been practiced in one form or another for thousands of years. The art consists, of course, in the use of small fragments of marble or other substances joined to form a pattern or sometimes a picture, which should never be so involved or intricate as to become confused. If a picture be undertaken it should be conventionalized, with as little detail as is necessary for the design and of course with no attempt at perspective, particularly when the mosaic is to be used for covering a floor, where use must be made of design somewhat different from what would be appropriate were the mosaic to cover a wall or the half-domed apse of a basilica.

Mosaic depends for effect almost as much upon its color as upon its directness and simplicity of design, and both are impaired when too much is attempted in the way of shading to create perspective or when over-elaborate detail is worked out by the use of varied colors of marble.

It was not until rather later than the golden age of mosaic that excessive elaboration brought a loss of virility and directness. Mosaic and stained glass have much in common, and the masterpieces in both these fields of art are the result of appropriate use of materials which are themselves comparatively simple, the success of the work depending upon careful drawing and upon skill in the use of detail which included full knowledge of the value of restraint. Mosaic paving was borrowed from the Greeks by the Romans who developed it to a high point of perfection.

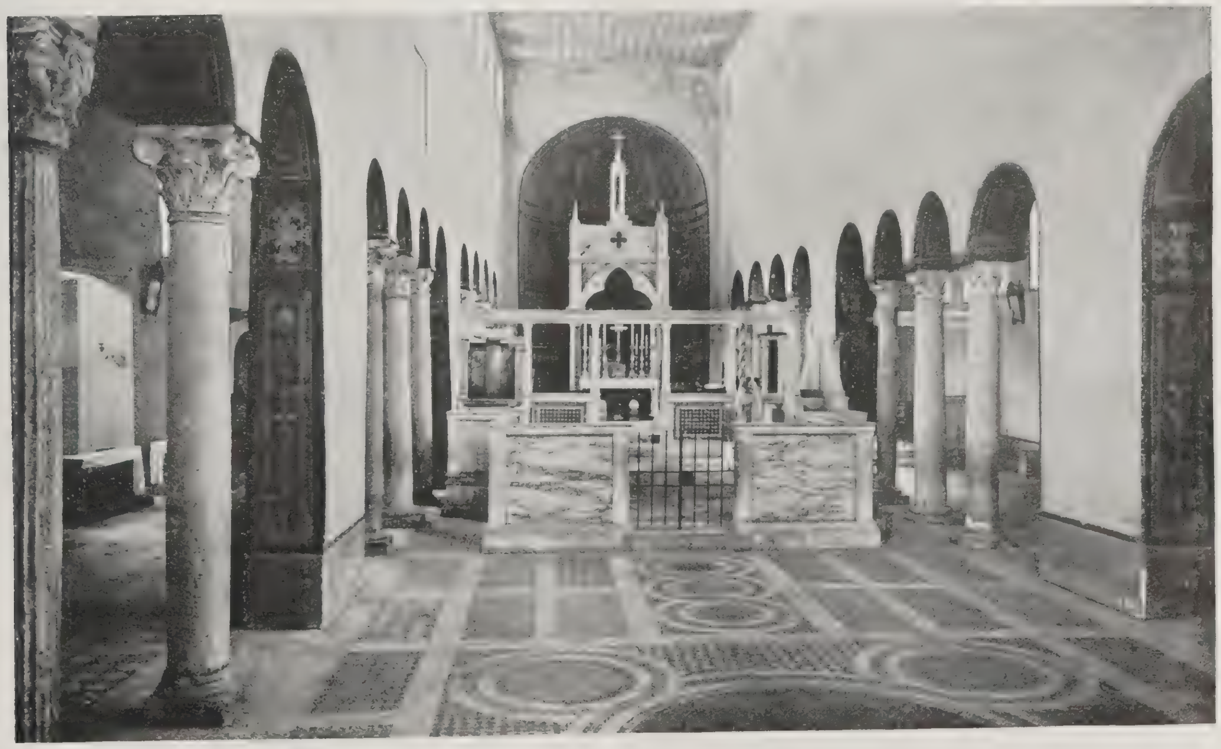
There are four major types of mosaic paving, which are thus described:

1. *Opus tessellatum,* which is made up of cubes or *tesseræ* of stone or marble about ¾-inch square, laid to form simple geometrical patterns. *Tesseræ* of this form are of course sometimes used in other kinds of mosaic, but the work should not be called *opus tessellatum* unless its units are entirely of this square shape.

2. *Opus vermiculatum,* made of *tesseræ* of irregular shapes to conform to the pattern desired and of sizes of from ½- to 1/20-inch. Such mosaic in a background treatment or in large areas of one color somewhat resembles a mass of worms, which explains the name. This type of mosaic is generally of a pictorial character.

3. *Opus sectile.* Mosaic of this kind is made up of *secta* or units cut from marble or stone of many colors, and so laid that it is really a kind of marquetry worked out in marble and made to produce color as well as pattern.

4. *Opus Alexandrinum.* Much the same as *opus sectile,* excepting that the pattern would be geometrical and the units or *tesseræ* cut to forms which are triangles, oblongs, squares and hexagons.



Opus Alexandrinum Floor in Santa Maria in Cosmedin, Rome, Similar to Floor in San Marco

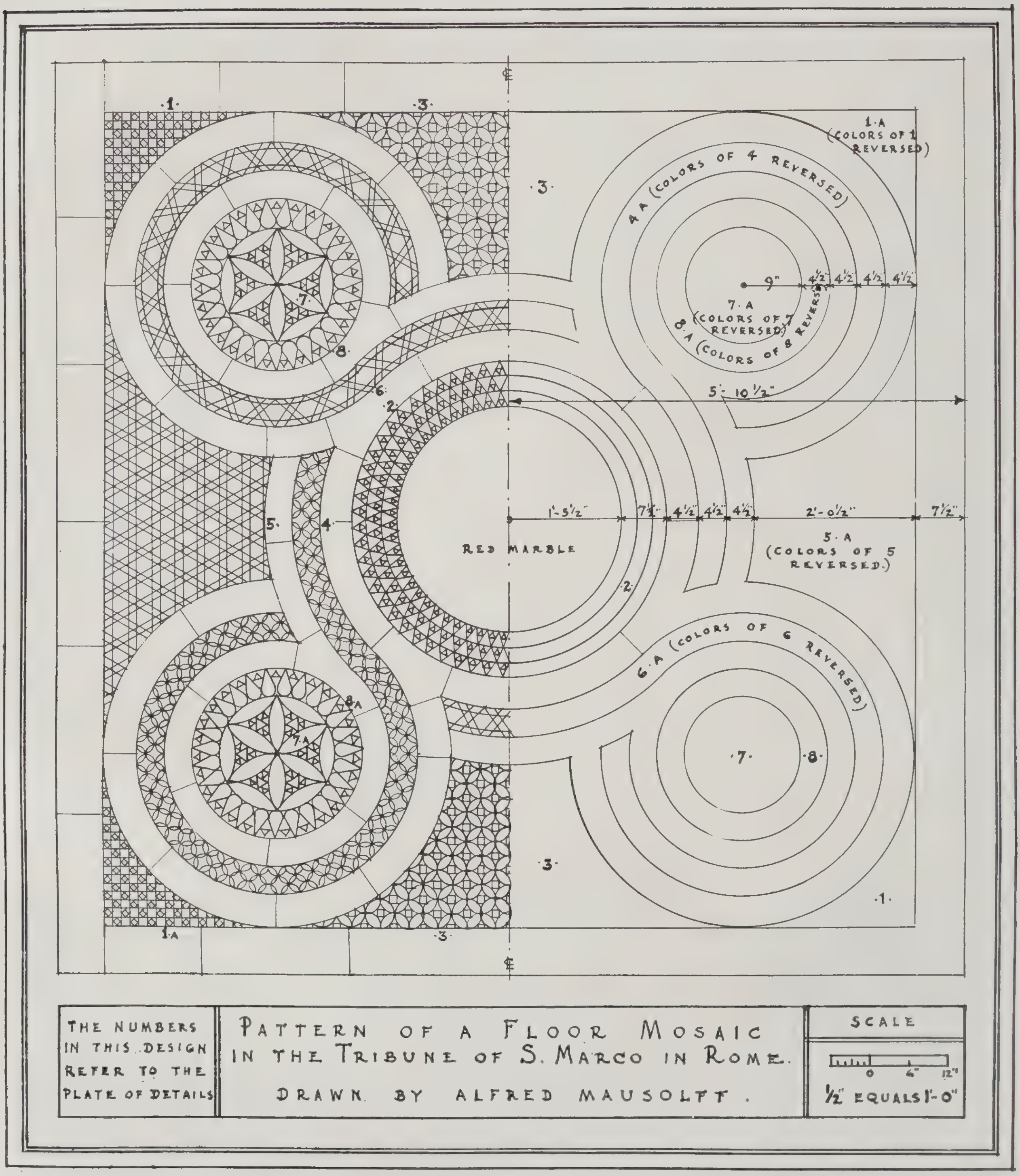
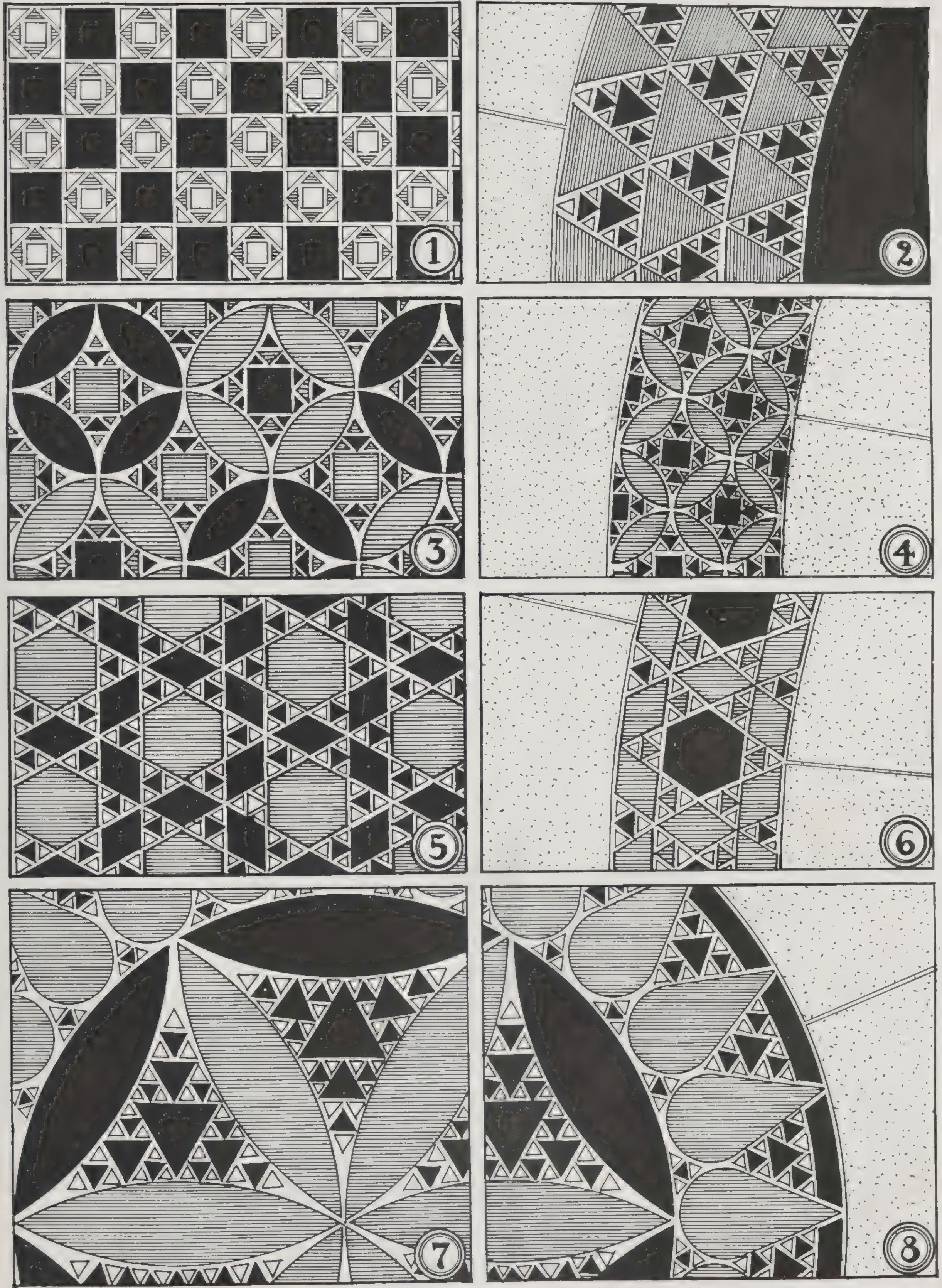

·1·
·3·
℄
1·A (COLORS OF 1 REVERSED)
4·A (COLORS OF 4 REVERSED)
·3·
9"
4½" 4½" 4½" 4½"
7·A (COLORS OF 7 REVERSED)
8·A (COLORS OF 8 REVERSED)
·7·
·8·
·6·
·2·
5'- 10½"
5·
4·
RED MARBLE
1'-5½" 7½" 4½" 4½" 4½" 2'-0½" 7½"
5·A (COLORS OF 5 REVERSED.)
·2·
6·A (COLORS OF 6 REVERSED)
8A
7·A
·7·
·8·
·3·
·1·
1·A
·3·
℄
THE NUMBERS IN THIS DESIGN REFER TO THE PLATE OF DETAILS
PATTERN OF A FLOOR MOSAIC IN THE TRIBUNE OF S. MARCO IN ROME.
DRAWN BY ALFRED MAUSOLFF.
SCALE
0 6" 12"
½" EQUALS 1'-0"

PLATE I

The mosaic floor patterns illustrated in these pages are from the Church of San Marco, which is built into the south wing of the Palazzo di Venezia in Rome. The entire floor of its tribune, which lies several steps higher than the nave, is beautifully treated with the form of mosaic known as *opus Alexandrinum*. Plate I shows the general scheme of the central design at the high altar, clearly outlined by the bands of creamy white marble. Plate II gives details of the mosaic patterns which fill in the fields between these bands of the major design.

The usual red porphyry, verd antique, and creamy white marble make up the color scheme. The reds and greens are in actuality very nearly identical in color value, and fairly dark. This permits them to be exchanged in opposing fields of the design without disturbing the coherency and balance of the whole. The cement used is grayish white in color, with joints varying from ⅛- to ⅜-inch.

In general, the cream bands are dull and soft in appearance, whereas there is a certain polish and gloss to the red and green pieces, and the floor as a whole does not possess the harsh regularity and stiffness of many of our modern examples.



| COLOR KEY | |
|---|---|
| ⁘ | WHITE |
| ▤ | GREEN |
| ■ | RED |

DETAILS FROM A FLOOR MOSAIC IN THE TRIBUNE OF S. MARCO IN ROME.

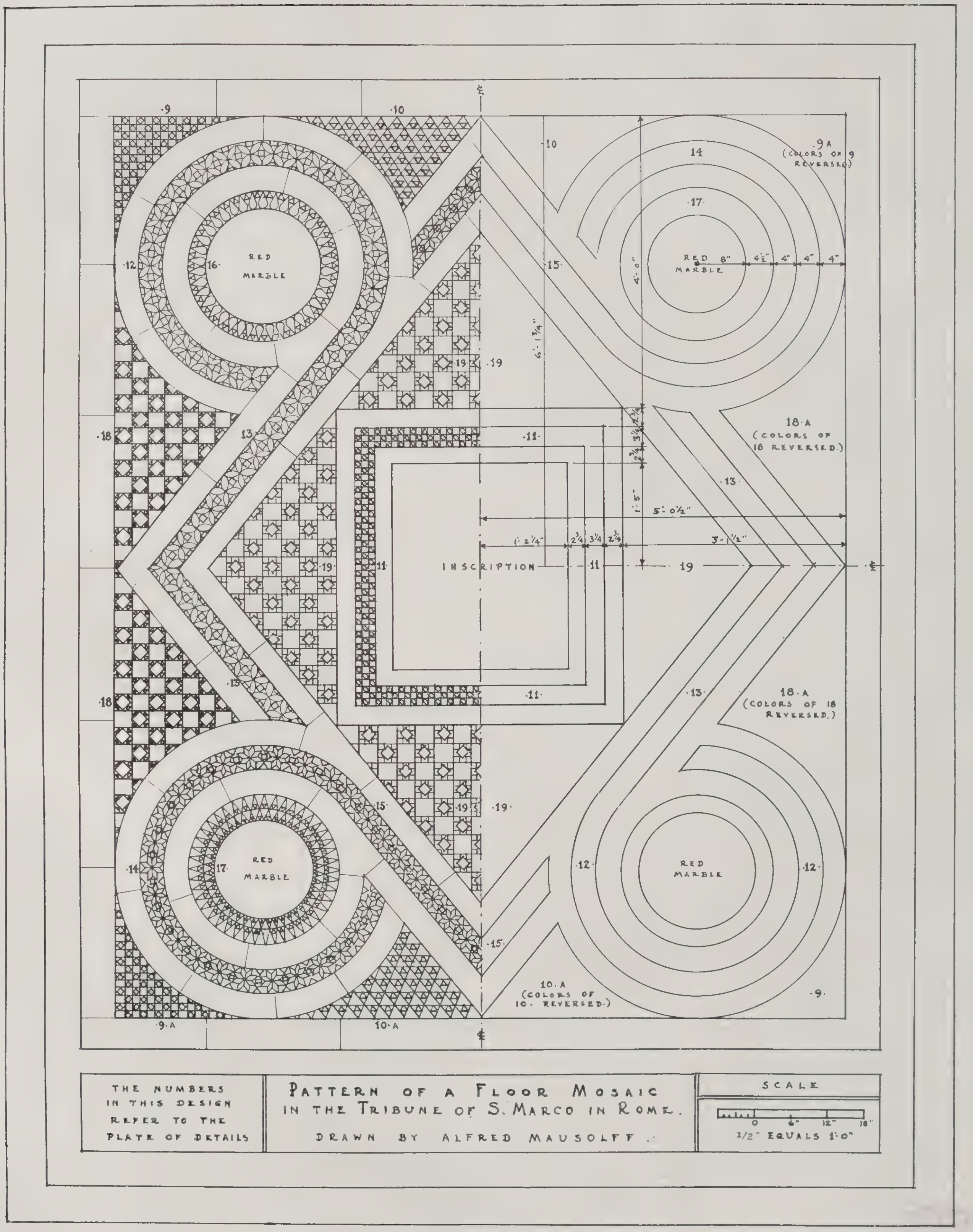
DRAWN BY ALFRED MAUSOLFF

SCALE

0 1" 2"

3" EQUAL 1'-0"

PLATE II



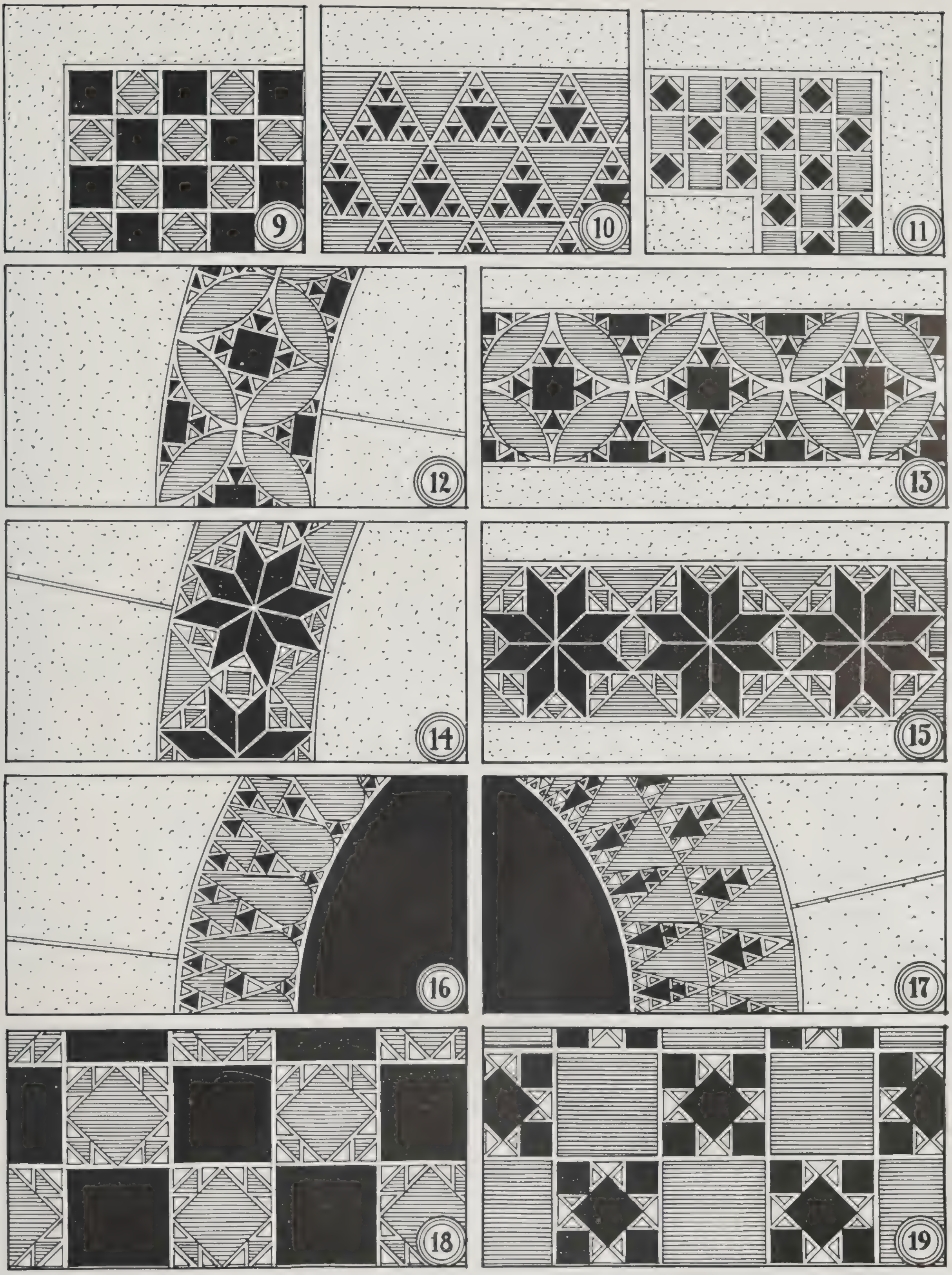
THE NUMBERS IN THIS DESIGN REFER TO THE PLATE OF DETAILS

PATTERN OF A FLOOR MOSAIC IN THE TRIBUNE OF S. MARCO IN ROME.

DRAWN BY ALFRED MAUSOLFF.

1/2" EQUALS 1'-0"

PLATE III



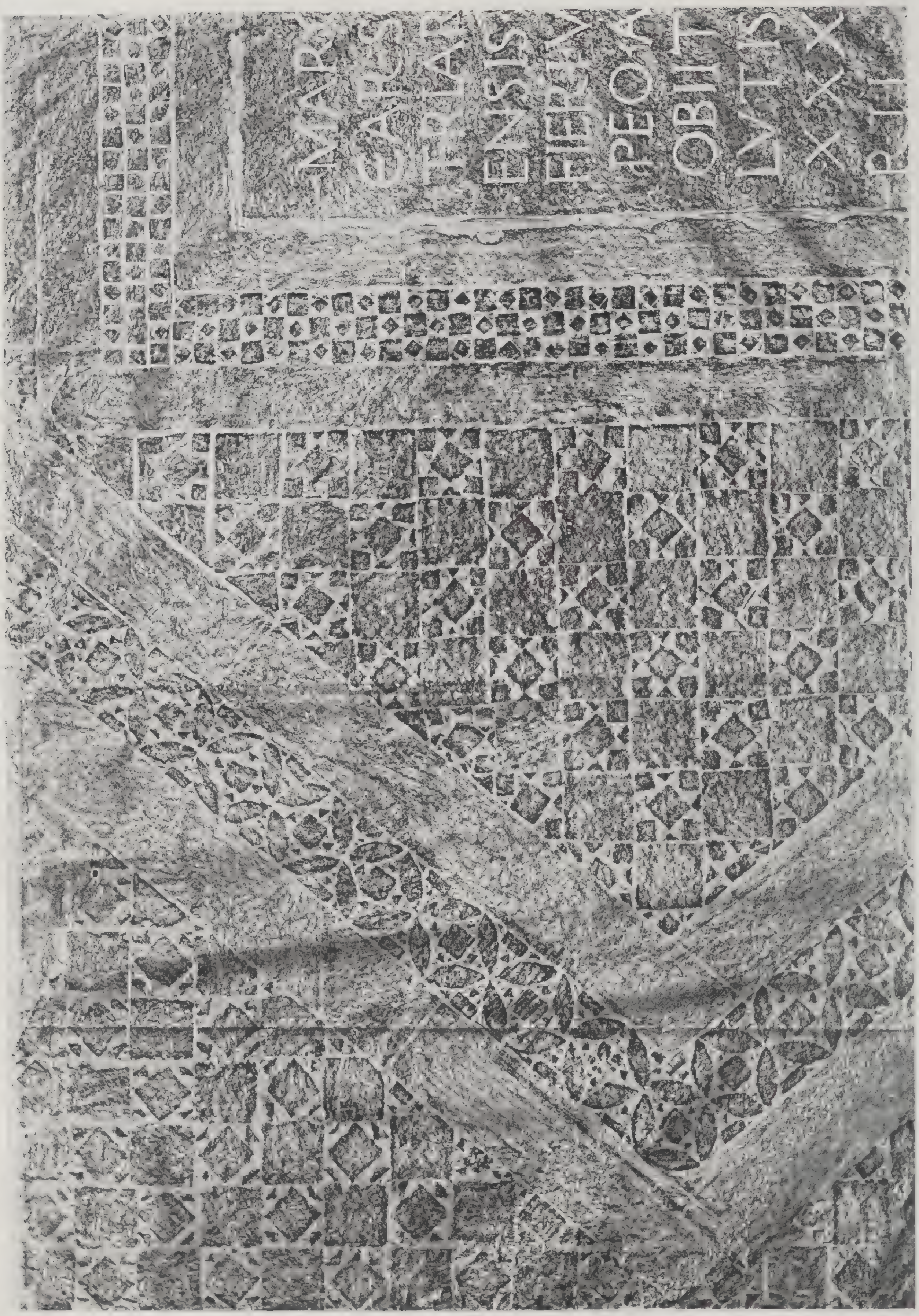
| COLOR KEY | |
|---|---|
| ⬚ | WHITE |
| ▤ | GREEN |
| ■ | RED |

DETAILS FROM A FLOOR MOSAIC IN THE TRIBUNE OF S. MARCO IN ROME.

DRAWN BY ALFRED MAUSOLFF.

SCALE
0 1" 2"
3" EQUAL 1'-0"

PLATE IV



REPRODUCTION OF AUTHOR'S FULL SIZE RUBBING OF PORTION OF SAN MARCO FLOOR

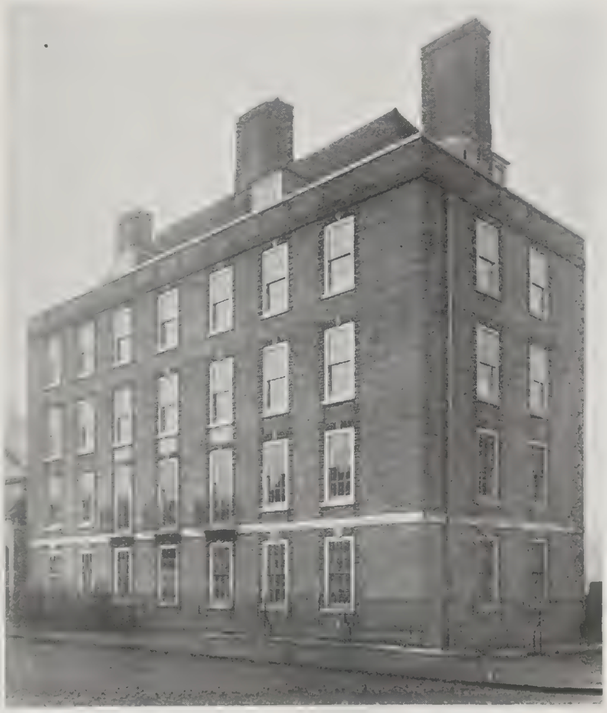
# Recent English Tenement and School Buildings

## A REVIEW OF HOUSING WORK BY THE LONDON COUNTY COUNCIL

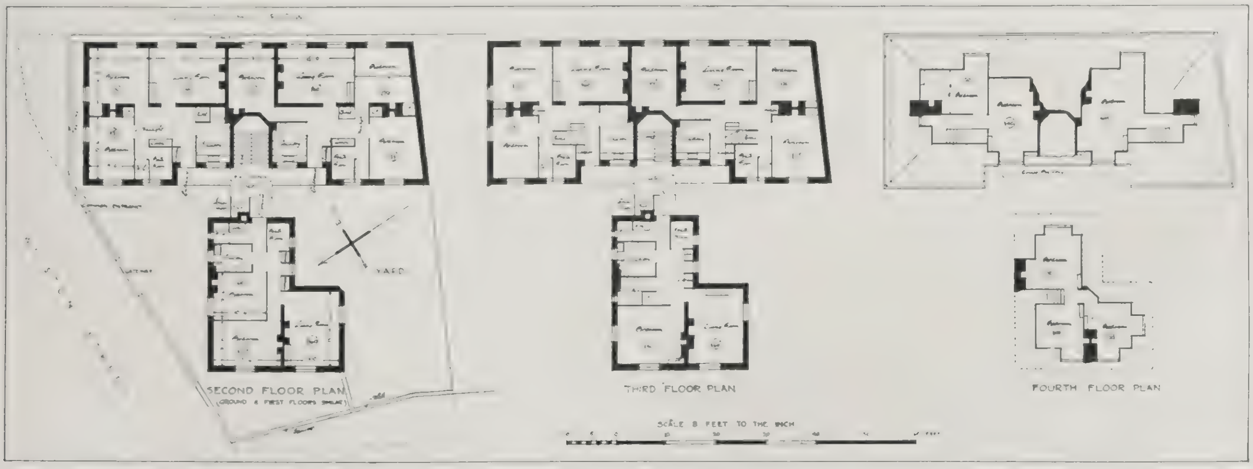
*By* H. J. BIRNSTINGL, A.R.I.B.A.
*Late Assistant Architect, Ministry of Health*

IN a former article certain recent housing developments of the London County Council were discussed, but these, important as they are, represent only a portion of the council's contribution towards improving the housing conditions of its area. The other important aspect of the matter is concerned with the improvement of unhealthful areas. In November, 1921, the council reported that there were about 1,900 groups of three or more houses that required to be dealt with as being unhealthful within the meaning of the housing act. In addition to this there was, of course, an immense amount of overcrowding. For instance, the recent census showed that there were 20,000 families of three persons, 7,000 of four persons, and 2,000 of five persons, who occupied one room per family.

Now the problem of dealing with unhealthful areas in a city of such magnitude is not so straightforward as it might at first appear, for it cannot be solved by providing accommodations elsewhere for the surplus population, many of whom, such as market porters, dock workers, postmen and firemen, must live in close proximity to their work; and even to move the remainder to the outskirts is only to add to the transportation difficulty. Moreover, it is highly undesirable that London should continue to encroach indefinitely upon the countryside. Further development around London must be in the nature of self-contained, satellite towns, such as that now being developed at Welwyn.


Exterior of Whiston House, London

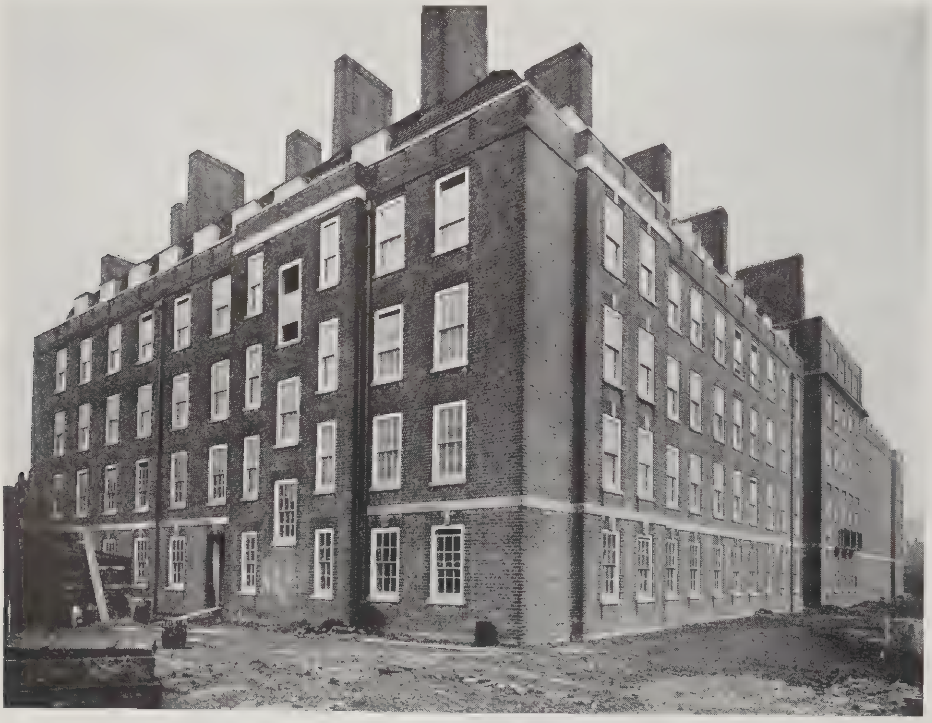
One of the worst areas in London to be successfully dealt with was known as the Brady Street area. Its new name is the Collingwood Estate. In this development, 1,600 persons, representing 85 per cent of those displaced, were re-housed on the area. An all-important matter to be decided was the type of dwelling best suited to the circumstances. The traditional English home is the cottage type, but there are occasions when modern conditions render its adoption quite impracticable. On the other hand, tall buildings are also objected to, and it must be remembered here that London is a northern city (700 miles farther north than New



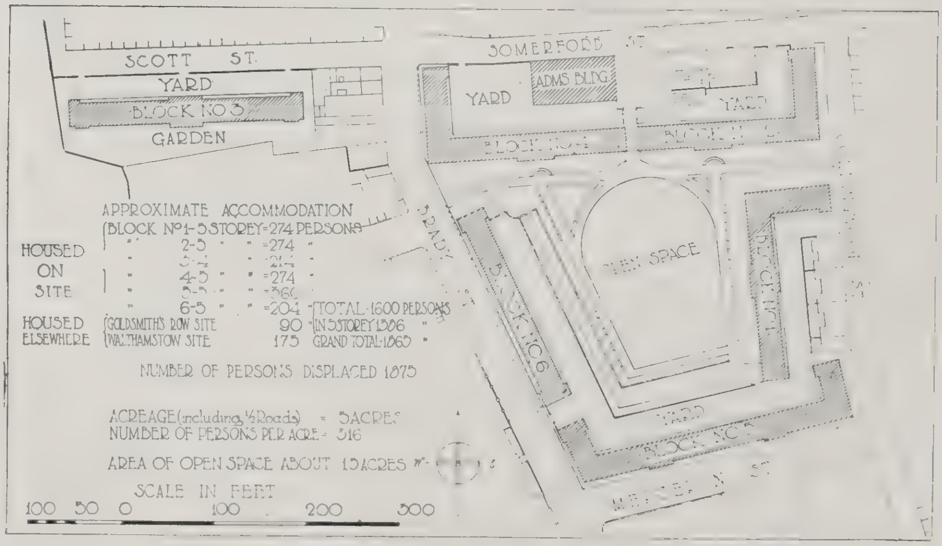
Whiston House, London. A Working Class Tenement House
G. Topham Forrest, Architect to the London County Council

York), so that the average angle of the sun with the horizon is only about 40°, and therefore comparatively long shadows are cast by even low buildings. This fact, however, affects the matter both ways. Thus, supposing an area is developed with low buildings, they will not, provided there be no overcrowding, interfere with each other; but should the surrounding land become covered with large industrial and commercial buildings, the houses would find themselves at the bottom of a well, as it were. In dealing with the Brady Street area a number of different type buildings were considered, and various experimental plans were produced. Thus with 23 cottages to the acre, 800 fewer persons could be accommodated; with three-story cottage flats, about 380 fewer, and with four-story blocks about 400 fewer than with the adopted type of five-story blocks. The remaining 15 per cent of the displaced population were housed on a site about three-quarters of a mile away, in a building attractively named "Whiston House, Goldsmith's Row." And for sheer beauty this dwelling must rank high among the council's architectural achievements. It shows the beauty which is the outcome of using simplicity, straightforwardness, fine proportions and good materials.

Another typical development is that known as the Tabard Garden Estate. Here the buildings are grouped in a series of blocks, each housing from 250 to 600 persons. Altogether about 2,500 persons are accommodated. This estate is situated in the heart of London, but nevertheless, a very large proportion of the site is devoted to open and recreational spaces. These are to be laid out as tennis courts, bowling greens and large central playing fields, the whole surrounded by rows of trees. These facts will give some idea of the manner in which the County Council is handling its responsibilities as the most important housing authority in the country.



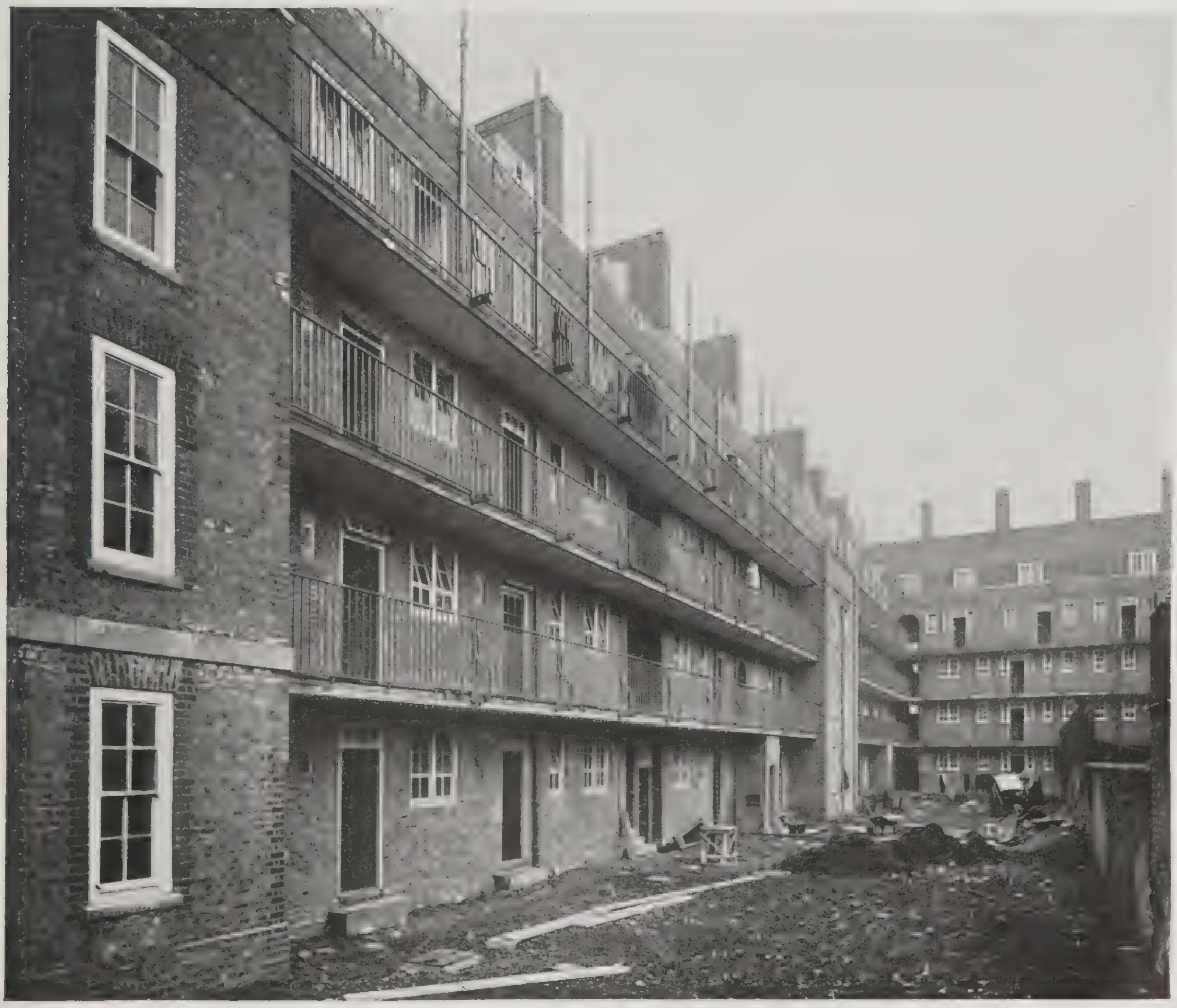
Bullen House (Block No. 1), Collingwood Estate, London



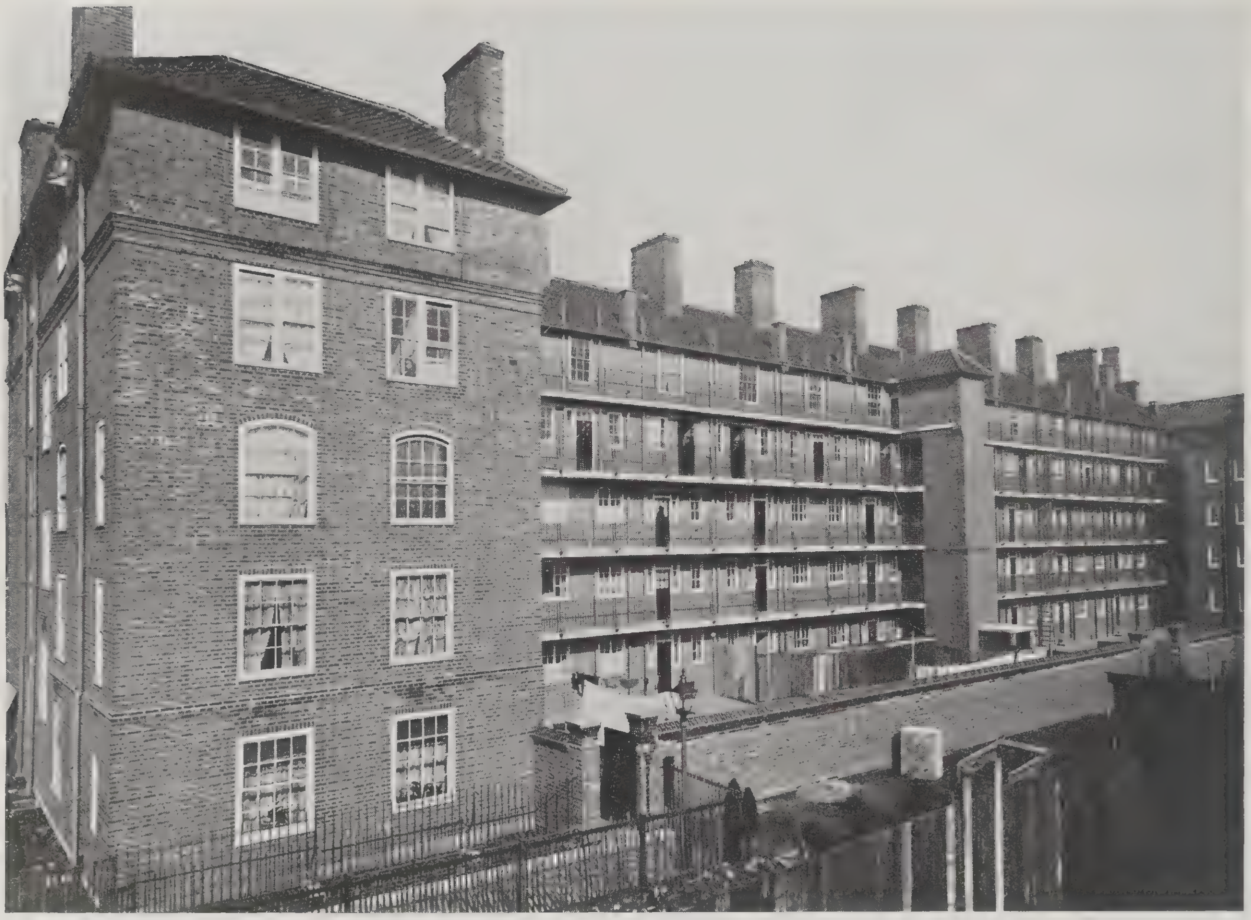
Plot Plan of Collingwood Estate, London
G. Topham Forrest, Architect to the London County Council

Now as to the accommodation of the buildings, here, too, there have been changes in ideas and standards. They contain dwellings or "lettings," as they are called, with varying accommodation of from two to five rooms, the term "room" applying only to bed or living rooms, the scullery, bathroom, food-store, and water closet being common to all types and not included in these figures. In the matter of approach to the lettings a new departure has been made. Along each of the upper floors there is a balcony reached by one or more common staircases, and from this balcony access is obtained to the various lettings. This system has a two-fold advantage; it does away with the necessity of having a number of staircases, which are costly to construct, which constitute waste space, and are difficult to keep clean, and, moreover, the continuous balcony makes it possible that babies and small children be in the open air while still under the supervision of their mothers. There is a prejudice against the continuous balcony, for it is said to militate against privacy and to darken the rooms. With skillful planning, however, both these difficulties can be successfully overcome. The other chief innovation is with regard to the internal arrangement of the lettings, which are planned with a ground floor and four superimposed floors. Of these the ground, the first and second floors contain flat tenements, but the third and fourth floors are combined into cottage tenements, each having the living rooms and kitchens on the lower floor with the bedrooms above, and each dwelling, of course, having its own internal staircase. The common staircases, therefore, are not carried above the third floor. There is a further economic advantage from this method of planning. With the old type of tenement building the rents for the top floor were less than for the lower, while now by combining the two upper floors the rent for the lower floor is obtained throughout. The planning is so arranged that the living rooms have the best aspect, while the scullery, bathroom, etc., are placed towards the balconies. The sizes of the rooms of course vary, but the minimum sizes of rooms in the council's dwellings are: living-rooms 160 square feet, main bedrooms 120, and other bedrooms 100 square feet.

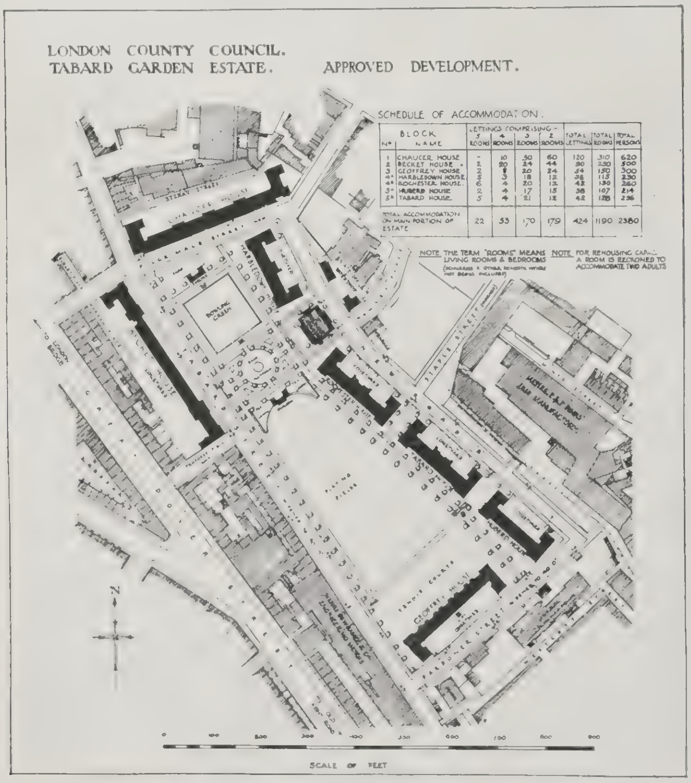
The building activities of the London County Council have not, however, been confined to the provision of dwellings. A very important branch of its work is connected with school building, and here very interesting changes in design have taken place. In order to appreciate these it will be necessary to follow the trend of thought during the last few years. About 1910 greater prominence was given in the school curricula to singing and to drilling, and it became necessary to plan halls so that these activities could be carried on without disturbing those at work in the classrooms. Moreover, the undesirability, on account of ventilation and dust, of having the classrooms opening out of these



Rear View of Bullen House Showing Balconies Giving Access to Tenements
G. Topham Forrest, Architect to the London County Council



Court View of Geoffrey House, Tabard Garden Estate, London
G. Topham Forrest, Architect to the London County Council



SCHEDULE OF ACCOMMODATION.

| BLOCK Nº | BLOCK NAME | LETTINGS COMPRISING - 5 ROOMS | 4 ROOMS | 3 ROOMS | 2 ROOMS | TOTAL LETTINGS | TOTAL ROOMS | TOTAL PERSONS |
|---|---|---|---|---|---|---|---|---|
| 1 | CHAUCER HOUSE | - | 10 | 30 | 60 | 120 | 310 | 620 |
| 2 | BECKET HOUSE | 2 | 20 | 24 | 44 | 90 | 250 | 500 |
| 3 | GEOFFREY HOUSE | 2 | 8 | 20 | 24 | 54 | 150 | 300 |
| 4A | HARBLEDOWN HOUSE | 5 | 3 | 18 | 12 | 38 | 115 | 230 |
| 4B | ROCHESTER HOUSE | 6 | 4 | 20 | 12 | 42 | 130 | 260 |
| 5A | HUBERD HOUSE | 2 | 4 | 17 | 15 | 38 | 107 | 214 |
| 5B | TABARD HOUSE | 5 | 4 | 21 | 12 | 42 | 128 | 256 |
| TOTAL ACCOMMODATION ON MAIN PORTION OF ESTATE | | 22 | 53 | 170 | 179 | 424 | 1190 | 2380 |

NOTE. THE TERM "ROOMS" MEANS LIVING ROOMS & BEDROOMS (SCULLERIES & OTHER DOMESTIC OFFICES NOT BEING INCLUDED)

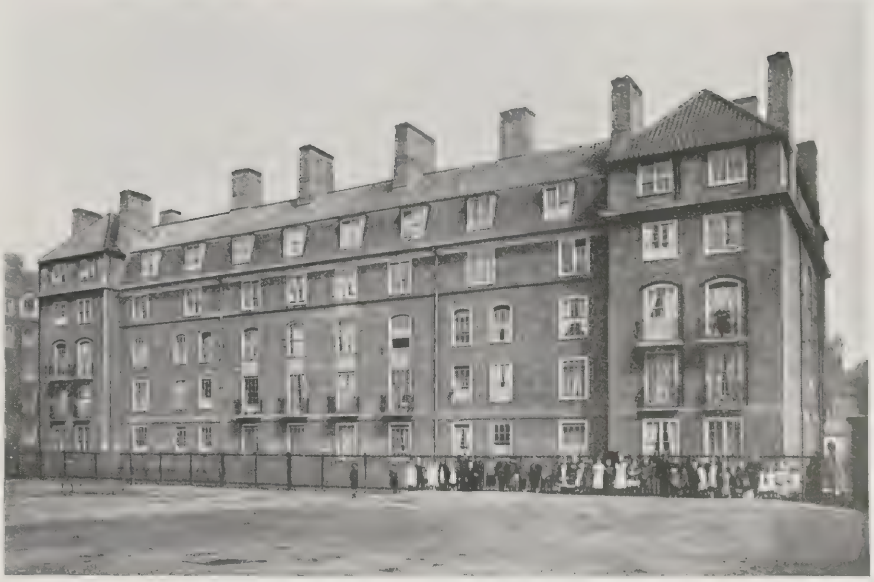
NOTE. FOR REHOUSING CAPACITY A ROOM IS RECKONED TO ACCOMMODATE TWO ADULTS

Plot Plan, Tabard Garden Estate, London

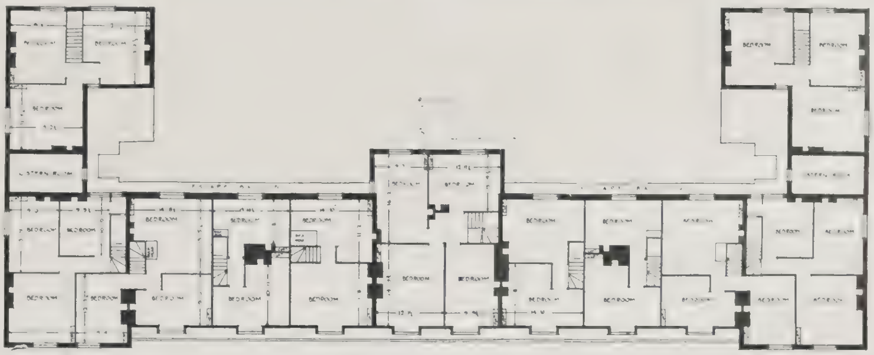
halls was realized. About the same time the immense value of fresh air and sunshine for growing children was appreciated. All these tendencies received support in the regulations issued by the Board of Education in 1914. Now there are certain types of building which are dependent for their efficiency upon conformity with modern ideas of hygiene. But whereas the effective life of a properly constructed building may be a couple of hundred years, ideas of hygiene are in a state of constant flux. It therefore happens that a building such as a hospital or a school becomes obsolete within a few years of its erection. The most perfect type of building, therefore, for these purposes, would be one which could be adapted in some degree and at no great cost, to these constantly changing standards. This it is at which the County Council is now aiming in certain of its school buildings, and the enforced economy which is the outcome of the war has without doubt suggested a method for achieving this object. What is wanted is a building, the *effective* life of which shall approximately coincide with its *useful* life, and which shall be low in first cost. During the war there was an immense impetus in all kinds of temporary and semi-permanent construction. In the trains of the divers armies temporary buildings were erected for men and stores, for hospitals and offices, for the purposes of manufacture and recreation, and every available piece of spare land, and even the roofs of many of our buildings, were utilized for the same purpose. Many of these buildings were extremely efficient, and it is along these lines that the County Council is endeavoring to meet the particular requirements of the school building.

All these factors, then, have led to the erection on the County Council's estates, at Roehampton and Bellingham, the housing schemes of which were dealt with in the December Forum, of a new type of school which somewhat resembles in plan a sanatorium. There is a central or administrative portion which contains the assembly hall, teachers' rooms, storerooms, etc., and the classrooms extend as wings. Such a type of building requires lateral space, since the classrooms are essentially one-story structures. Fortunately, on these estates the council was able to reserve large sites. On the Roehampton Estate two acres have been allotted for elementary schools, six acres for a secondary school, and four acres for an open-air school. The central or administrative block is built of permanent construction, since experience has shown that the changes in requirements affect only the classrooms, and these are of a light construction, and can be regarded as variable, moderately flexible units, and thus made to conform to whatever new developments may arise.

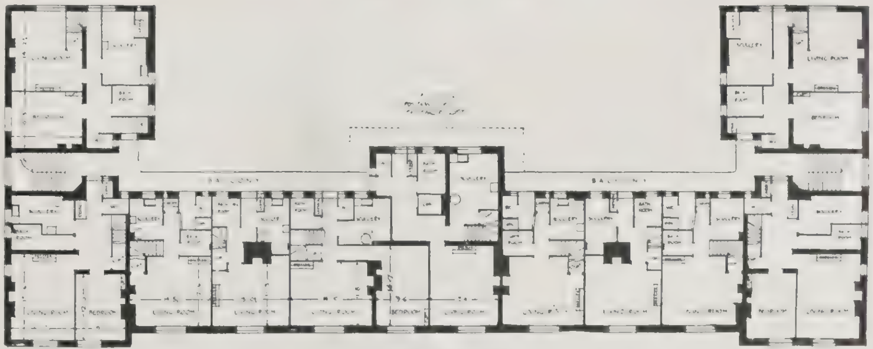
The new elementary school at Roehampton is divided into three departments, for boys,



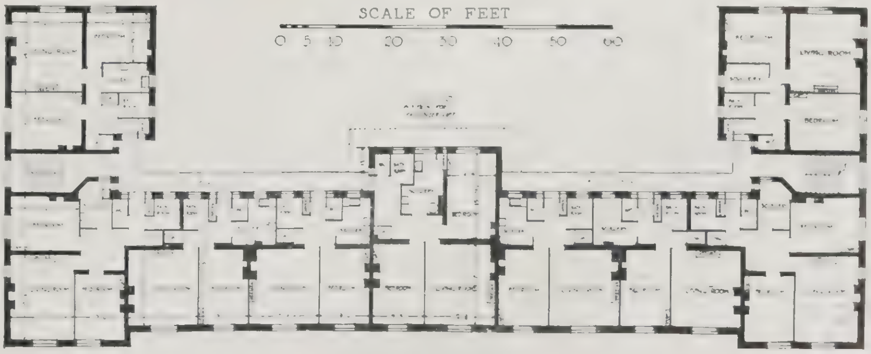
Harbledon House, from Recreation Ground



Fourth Floor Plan



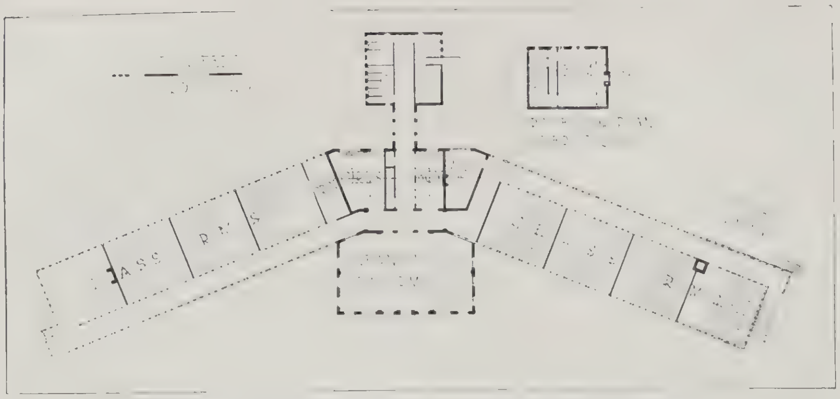
Third Floor Plan



Second Floor Plan

Harbledon House, Tabard Garden Estate, London

G. Topham Forrest, Architect to the London County Council

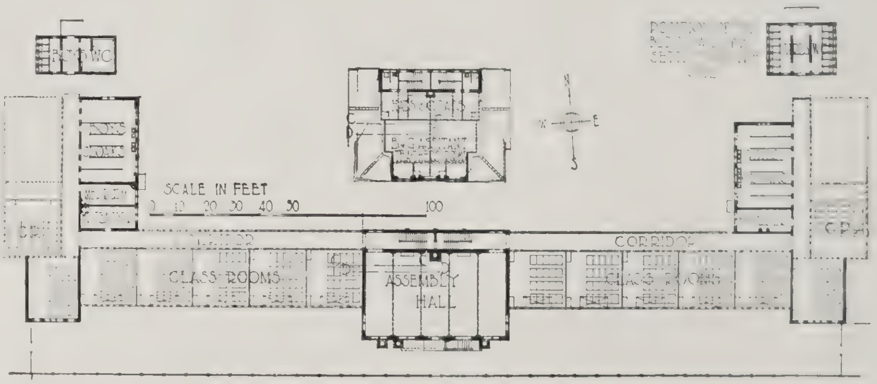


Ground Floor Plan, Elementary School, Roehampton
This building also accommodates a kindergarten

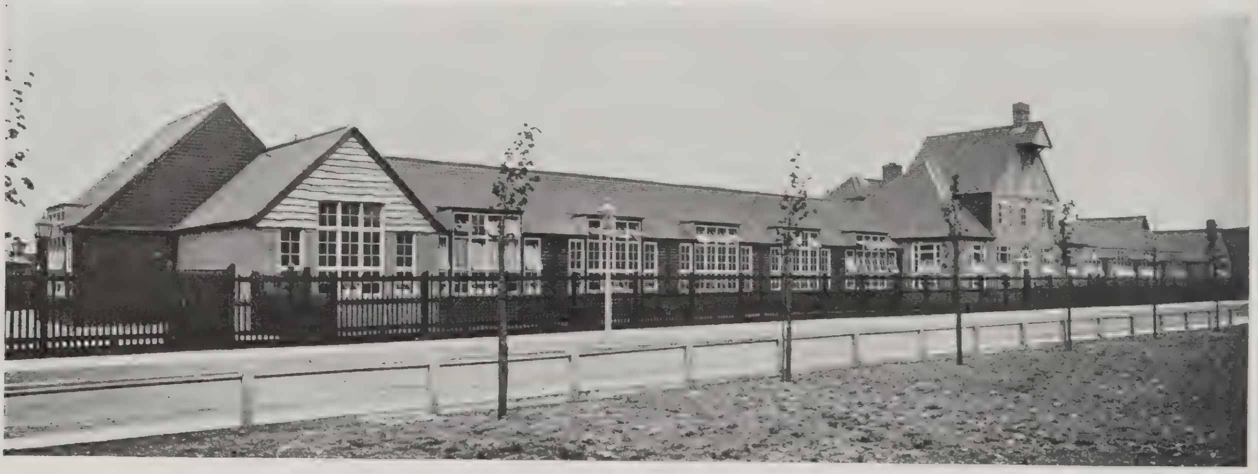
girls, and infants. Each of these consists of a one-story building of classrooms. Connected with each of the senior departments is a large hall, having an area of 4½ square feet per child, and for the infants a playroom having about 4 square feet per pupil. The area of the classrooms is about 400 square feet for the seniors and 430 square feet for the infants, accommodating 40 and 48 children. Provision is also made in the boys' and girls' school for rooms for instruction in practical hand work. Periodical medical inspection of every child, three times during the school career, being obligatory under the act of 1907, a special medical room is provided for that purpose. The pupils' toilets are no longer placed in a separate building as heretofore, the improvement in sanitary arrangements making this inconvenient precaution unnecessary. They are now placed in the main building, but separated from it by a cross-ventilated lobby. Another advantage arising from this method of construction is that during the summer months the classrooms can be thrown open so that they become semi-open-air schools, and this will have a vastly beneficial effect upon the physique of the children.

In the secondary schools laboratories form an important part of the accommodation, and certain general principles have been formulated for their design, of which the most important is that they must be capable of modification and expansion. For this reason glazed tiles and bricks for the walls, although ideal in certain respects, are now considered impracticable, because they do not admit of the ready alteration to fittings.

Lighting and illumination are matters that have received much attention of late. The relation of window space to floor area is at least as one is to six. Left-hand lighting is the accepted principle. As to artificial illumination, here the aim is the securing of an even distribution both downwards and obliquely, and a broad diffusion which shall avoid too sharp contrasts of light and shadow. There is also a tendency towards simplification in ventilation.



Ground Floor Plan, Bellingham Elementary School
Solid walls indicate permanent construction; open, temporary



Elementary School, Bellingham Estate of the London County Council
G. Topham Forrest, Architect to the Council

# ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

# Paint and Paint Specifications

*By* FRANK H. NUTTING

WHAT is paint? This question is not really so simple to answer as it may seem. Broadly speaking, paint, and it is meant here entirely in its relation to general building construction, is a medium composed of pigments for coloring, metallic or mineral base for covering, and a vehicle for binding these elements together and making the composition suitable for use with a brush. Paint has two general functions,—protection and decoration.

We use paint to cover the surfaces of wood, metal, plaster or other materials, and to protect them from the action of gases and atmospheric conditions. This is accomplished by filling the pores of the wood, for example, and making it impossible for dampness to penetrate and thus cause swelling or warping, and to aid in preventing the complete evaporation of the moisture content of the wood. Wood is never thoroughly dried out, even as it comes from the air-drying or kiln-drying process. There is always a certain amount of moisture which keeps the cells of the wood fiber alive, and when this moisture does completely disappear the action of dry rot, if the surfaces are not protected, will probably take place. It is important, therefore, to see that all of the surfaces of the material are protected in order to assure oneself of the maximum longevity of the wood. This is true whether the wood is for outside or inside use.

Most architects and engineers realize, of course, the importance of having wood finish painted on the back, but the real importance of this is not so fixed in their minds that they insist on the practice for the greater part of the work. This should be done, however, not only for the purpose of protection, as already described, but also to prevent moisture from dampening the plaster, and for protecting the wood back of the finish from the same swelling, warping or twisting.

There is a wide variance in architects' specifications on painting. This is, without doubt, due to various theories maintained by the proponents of the different paint methods. For example, one architect will specify on new work for interior painted finish four coats of lead and oil and two coats of enamel rubbed down,—sometimes three coats of enamel rubbed down, and specifications have come from architects and engineers calling for at least five coats of paint on outside woodwork. Another type of specification is one which calls for finish of the exterior woodwork with not less than three coats of white lead and oil, and for interior work, where enamel finish is to be used, three properly prepared undercoats with one coat of enamel. The difference between these two forms of specifications is not merely in the number of coats or the quantity of material applied, but is of far deeper consideration than either of these.

The first coat of paint applied to exterior woodwork, and that is true also to a certain extent on interior woodwork, is used as a protective and penetrating cover. The oil, or whatever vehicle is used in the first coat, is supposed to penetrate the pores of the wood, filling up any small interstices and carrying with the vehicle some of the pigment as well as the base. This "priming," as it is sometimes called, is usually very rich in oil and very low in covering quality. The second coat to be applied is, as a rule, the real covering coat. This coat is not so rich in its oil content, but is richer in the proportion of the base and pigment, so that after the second coat is applied the surfaces should be entirely covered, and no bare spots on the wood should be visible. The third coat, in order to insure good work, should be very rich in oil. When this third coat is applied the oil penetrates through the second and the first coat into the pores of the wood and forms a binder for all three coats to the material to which it is applied. The putting on of more coats on new work, more than the three coats, is merely in the nature of additional covering, and in some cases if the superimposed coats are less rich in oil the binding is not so complete, and in fact the bond of the first coats may be destroyed to a certain extent, which will result in peeling.

The oxidation process of the oil, which is analogous to the hardening of cement, takes place gradually, and in some cases the oil has been known to be in a more or less elastic state for a period of years. In order to secure a thoroughly firm, hard base on which future painting may be applied, it is, therefore, advisable to paint new work with only three coats, as already noted, and to allow these three coats sufficient time to harden between applications, and also to plan for a re-painting with one additional coat say the following year.

One can readily see that this additional coat, when applied, being fairly rich in oil, has a firm base in which the oil has partially hardened as the application surface. The oil may penetrate in this base. In the meantime the base itself has been practically homogeneous, and the addition of the new coat does not destroy the bond previously established, but acts as a further binder, filling in any pores of the original woodwork. There is no doubt that some will consider this theory unsound, but in actual tests it has demonstrated its validity.

There is probably nothing in the sphere of materials mentioned in architects' specifications which can be so easily adulterated as paint. An architect may specify that Blank's white lead shall be used; that it shall be mixed a certain proportion to the gallon of oil; that it shall be applied with a certain type of brush. His inspector may go on the work and see the can with Blank's name on it, but unfortunately this means nothing. In many cases a painter will buy a few cans of the specified material, not a third enough to do the work, and then will mix up his own material from whatever paints he elects, due primarily to a decreased cost to himself, and finish the work in this way. When a definite brand of prepared paint is specified, unfortunately this same process takes place. In some instances the specified brand will be bought in small quantities and the cans continually filled from a general supply base which the painter himself has prepared, and which bears no more relation to the specified brand than the painter himself bears to the reliable painters, of whom there are so many.

In speaking of this adulteration process, it is not with the idea of condemning painters in general, because this is far from being the case; it is merely to suggest to the minds of architects and engineers the possibilities when an unreliable painter is selected for the work. If the architect really desires to insure the highest grade of workmanship and results to his client, it is very apparent that it is quite as necessary to be as sure of the honesty of the painter who is to figure and of the quality of his work as it is of the selection of the proper material;—even more important, since with a good painter he has positive assurance that the results will be to the advantage of his client, even though an error may have been made in the selection of the proper materials in the specifications.

It is not necessarily a part of this discussion to speak of prices, but so often architects are called upon to reduce estimates, or called upon to get low bids, and the tendency is then to make cuts all along the line, that a word is included. One of these cuts naturally falls on the painter, and generally he is prepared at that time to reduce his price, which obviously must come out of the work somewhere. Use of this adulteration process is one of the first steps, although reliable painters, in the majority of cases, refuse to be a party to this form of change. Frequently bids will be received in which the painters' estimates are at a wide variance. A figure may be received from a man with whom the architect is unfamiliar, but who has had a reputation for doing good work. This figure may be far below any of the other estimates. The natural tendency would be to check up the man's reputation, look over some of his work, and see if the work has "stood up" satisfactorily. It is not advisable to stop there. The specifications should be carefully checked, and the work and material specified should be analyzed from the standpoint of the manufacturer's representative if possible. The manufacturers of the standard brands of paints are always ready and willing to coöperate with architects in checking up the quantities of their material furnished for the various jobs, and notifying them if the quantity of material specified is ordered for the work. In this way the first check on adulteration can be readily made.

The can of paint or varnish on the shelf of the hardware store, in the paint shop, or on the job is familiar to us all. Little change is noted as the years have passed. It is better labeled, neater in appearance, but after all the same old can. But, let us look inside. What a difference! Twenty years ago it seemed as if most manufacturers were trying to get the most profit out of the can rather than into it. Then came the realization that it was better business and more profitable to increase the quality, until the time has arrived when one is confident that one is getting a paint or varnish of the very highest quality. White lead and oil are still the important ingredients. New materials are being used, and the laboratories of the paint and varnish industries are continually working to improve their products.

The users of paint and varnish, as well as the architects who specify them, should be better informed as to the value of the different ingredients, thus assuring themselves that the proper material is selected for each surface. Lithopone is a comparatively new base for paints. It has many peculiar qualities that make it a valuable pigment. It is the foundation of nearly all flat wall paints. Its "covering" or "hiding" qualities are greater than those of any other pigments. It should never be found in a paint designed for outside work, as it turns gray when exposed, but it cannot be excelled for interior wall finish, either in white or in tints. When used in this way the vehicle is a flatting oil in which China wood oil forms an important part. Lithopone is unsuited for use in an undercoat for enamel, as it is very porous and permits the finishing coat to sink in, resulting in flatting.

High grade enamel undercoatings are now on the market, made by manufacturers who wish to insure the most satisfactory surfaces on which to apply their enamels. The undercoat for enamel, as well as all other work, plays an important part. It is too often slighted or neglected, and many an apparently fine job is ruined and lacks durability because the under surface is not suitable for the work. If the painter is to make his own undercoat for enamel, let him use the highest grades of lead and zinc, employing the right quantity of thinners, and, of course, plenty of sandpaper and hard work.

An excellent specification for enamel undercoating is, for the first coat, white lead and pure linseed oil, with sufficient dryer to harden; second coat, white lead and turpentine; third coat, one-half white lead and one-half pure zinc oxide with turpentine. If a fourth coat is to be applied, let it be zinc oxide and turpentine with the addition of a small amount of white enamel. Sandpaper each coat. Strange as it may seem, it is quite as important to rub or sandpaper the paint *off* as it is to put it *on*. Sandpapering between each coat insures a smooth, hard, durable finish on the last coat, which will wear for years without cracking or checking. Be sure that each coat is dry.

French process zinc is one of the most durable and whitest of pigments. It is extensively used in the manufacture of enamels, and in connection with lead for both interior and exterior paints. It gives a hard, firm surface, not porous, and holds its pure white appearance. Too much zinc in connection with lead, as used in outside paints, is apt to result in peeling.

While it is true that the so-called "inert" materials were once used as adulterants, many have been found of real value, and are now introduced by the paint maker to improve the durability of the paint. A reasonable amount of magnesia or asbestine is undoubtedly desirable. This material not only helps to keep the paint in suspension while in the can, because of its fibrous nature, but its particles sift into the minutest spaces between the particles of lead and zinc, thereby resulting in a more uniform metallic film, keeping the oil from soaking into the wood, as well as keeping moisture out. A percentage of asbestine is obviously better than an overabundance of zinc, but for high grade paint it should not exceed 20 per cent. It is used in flat paints largely so that the paint may be kept in suspension, but when used to excess it not only cheapens the cost but spoils the hiding qualities.

High grade enamels bear but little resemblance to former so-called enamels, which were made from zinc mixed with damar varnish and thinned with turpentine. Such an enamel was very difficult to apply, and, while very white, was inclined to be tacky because a varnish made with damar gum never dries thoroughly hard. White zinc of the very highest grade to which treated bleached oils are added now produces high grade enamels. While more likely to turn yellow if kept in the dark, they are fully as white as ordinarily used. They are easily applied, no matter how large the surface, flow freely, avoid brush marks, and they are far more durable.

The painter is now being educated to the fact that a quart of high grade enamel, mixed with a gallon of pure lead and oil paint, not only produces a better and more lasting white, but actually adds to its durability. It also has the advantage of retaining its gloss.

No material has been found as a thinner which can take the place of turpentine. High grade turpentine substitutes, which contain petroleum, can be used to advantage in flat paints, producing better flowing qualities because of their slightly oily nature, but they are most unsatisfactory as thinners for either Japan colors or varnish.

Dryers of the very highest grade should be specified and used. A cheap dryer has very little drying quality, and, being composed largely of rosin and benzine, it injures the paint. Only enough dryer should be used to dry the paint, and, as only a good painter is familiar with the work, it is always economy to employ the best. The perfect dryer must be finely balanced. It must not start drying the paint from the bottom, as that would leave the surface moist for so long that it would gather dust or be ruined by sudden rain. Neither should it dry from the outer surface in. Paint in which a dryer of this type is used, while dry on the surface would never thoroughly harden, as the dry outer film would prevent further oxidation of the oil. The perfect dryer dries uniformly all the way through.

No material plays a more prominent part in present-day varnish making than China wood oil. This oil, produced from nuts which grow extentively in China, has been known for years, but only comparatively recently has it been used successfully, because of lack of knowledge of its qualities. Its principal advantage is in its waterproof qualities, and it will be found in all the quickly drying spar and all-purpose varnishes. A former adulterant of varnish,—rosin,—must now be used in connection with China wood oil. The use of all-purpose varnishes is not to be recommended for the best results. Use a varnish which is made expressly for the work in hand. Linseed oil and fossil gums, the ingredients of all the best old style varnishes, still play an important part. While China wood oil makes a waterproof varnish, linseed oil gives a more durable and elastic film and will be found in the best floor and spar varnishes. Good qualities of fossil gums for varnish making are constantly more difficult to obtain, and were it not for China wood oil, which requires very little gum, the prices of varnish would be almost prohibitive.

Shellac should never be used as an undercoating for varnish on floors or exterior woodwork. It not only lessens the wearing qualities of the varnish used over it, but is generally the cause of a good floor varnish's turning white from water, or scratching badly. Build up the surface entirely with the best quality of varnish.

The floor problem is perhaps the hardest with which the house owner has to contend. Shall it be waxed, shellacked, or varnished? Each has its advantages and disadvantages. Wax is easily applied, dries quickly and gives an excellent appearance, but it spots with water, and, although easily refinished, is not to be recommended in rooms where it is likely to be affected by water. Shellac has the advantage of drying quickly, which certainly is an advantage in an occupied house, but it also is affected by water, and scratches easily. However, when rubbed with pumice stone and oil, it makes a very durable and attractive floor. Use of varnish presents none of these objections and undoubtedly varnish makes the best wearing surface for hard wear. Its only drawback is the time necessary for drying, which frequently does not permit its use where the room must be occupied daily. Today we have very excellent floor varnishes which dry with a soft, dull finish, equaling in appearance the finest old waxed floors. Avoid the use of flat varnishes containing wax, as they are not so satisfactory, and require removal when the work is to be refinished.

Cold water paints and kalsomines are very much of the same nature. The original cold water paint was made from whiting with casein used as a binder. The manufacturers made a very strong attempt to replace lead and oil on the cheaper class of work with this material for exteriors, but without a great deal of success. Its use now is confined almost entirely to interior walls and ceilings. Either of these materials applied to walls or ceilings is very pleasing in effect, but it lacks durability as such paints cannot be properly cleaned. As a suggestion for obtaining the best results by use of kalsomine on the ceilings of the better class of buildings, try first a coat of lead and oil paint prepared so as to dry with an eggshell or nearly flat surface. Cover this with one coat of kalsomine. The result is a perfect ceiling, without a spot or blemish, but its principal advantage is more apparent when the ceiling is to be washed off and re-finished. The undercoat of lead makes it extremely easy to wash off the old kalsomine, at the same time offering a good surface for re-coating with freedom from suction.

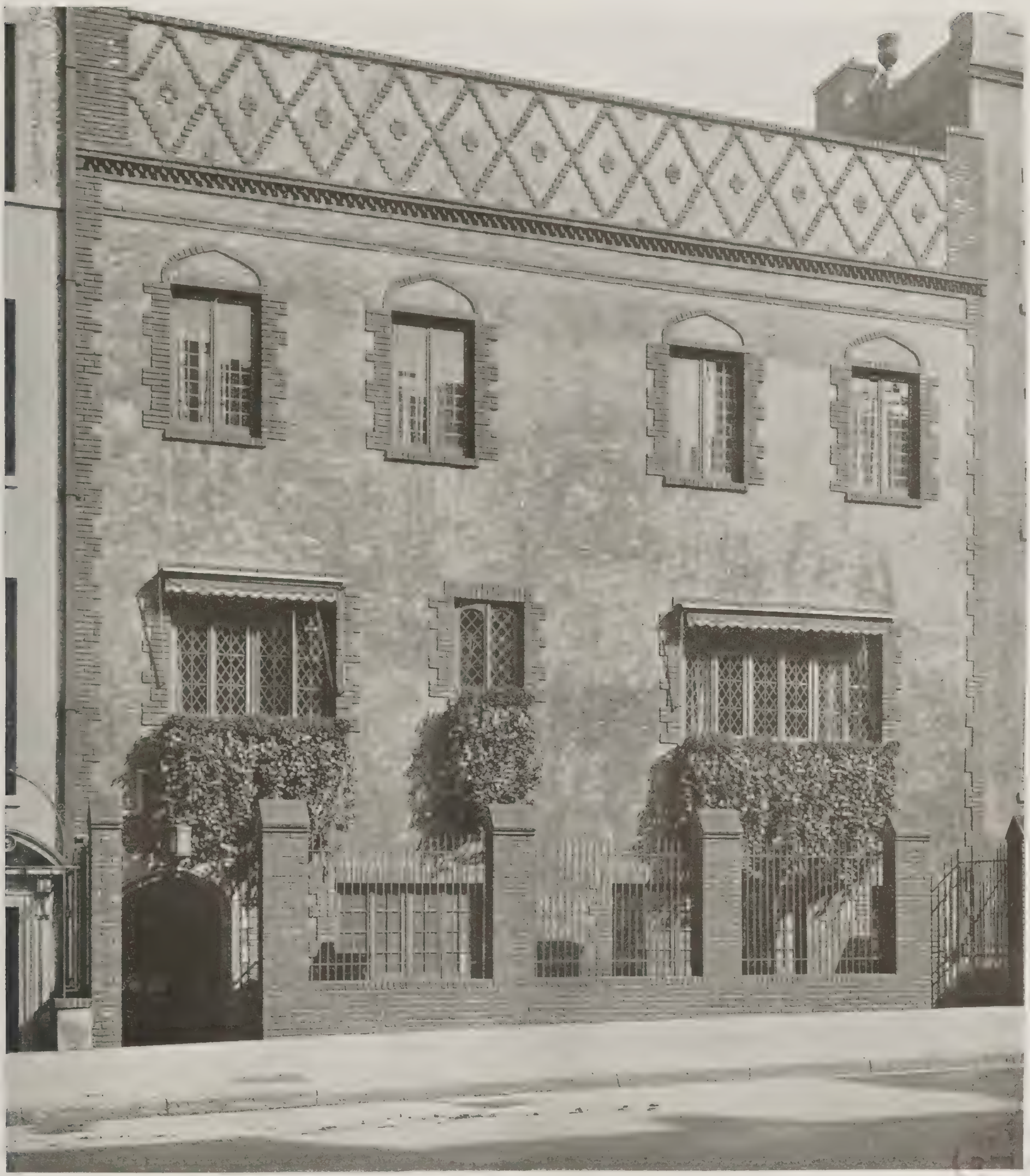
For iron girders, structural steel, etc., a good red lead for the first coat is generally accepted as the standard for durability and covering. This forms an impervious coating, effectually preventing rust, and to a large degree resisting the action of gases. This red lead primer should be given a second coat, either of graphite and linseed oil or of a paint composed of carbon black and oil.

While in a large degree the use of shingles for roofs is limited because of fire hazard, shingles are extensively used on the walls of some of our most attractive houses. When so used they should not be painted, but given one or more coats of either an oil or a creosote stain. The better method is to dip the shingles two-thirds their length, and after they are laid apply a brush coat of the stain. The dipping not only protects the under side of the shingle, which is the first to decay, but as the shingle shrinks it does not permit white streaks to show between the shingles. The objection to paint for use on shingles is not only on account of the glossy surface it would present, but because from its very nature it would form a little dam at the butt of the shingle, thus retaining moisture beneath, thereby hastening rather than preventing decay.

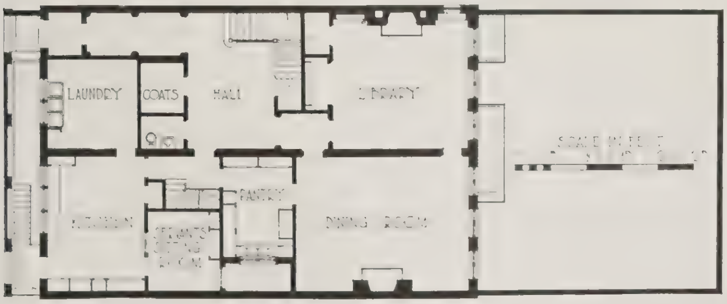
A comparatively new problem now confronts us, due to the use of concrete and stucco for industrial plants and residences. Here a paint containing linseed oil is out of the question, for the action of the oil on the cement would disintegrate the compound, but a coating of some kind must be used to prevent moisture from passing through the walls. Fortunately there are on the market many well known cement coatings of proven worth. These can be had in many attractive colors as well as white for either inside or outside use.

On cement floors of office buildings and factories great difficulty has been encountered through the "dusting off" of the surface. Here is an opportunity to use the cement coatings either in flat or gloss as a preventive. A coat of flat followed by a finishing coat of gloss gives a harder and more durable finish, and one that can be more readily washed and kept in sanitary condition.

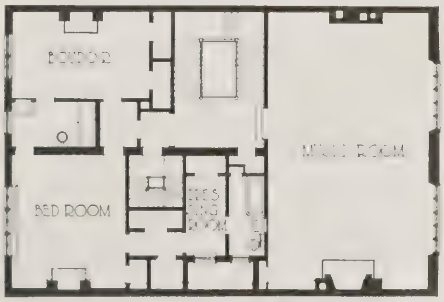
To sum up, don't neglect the painting either to save time or expense. It is the one thing that not alone prevents the rapid deterioration of the buildings, but adds to the beauty of the structures. Specify the best grade materials you can afford. Select those of proven worth made by manufacturers of the highest integrity, but don't rest here. If you are to be responsible for the work, notify the agent of the manufacturer whose paint, varnish or enamel you have selected and let him follow up the painter. Give the work to the painter you can trust. Don't hurry the job at the last. Have pity for the poor painter who is last on the job. He is often expected to put on four coats where he barely has time to apply two coats with proper time for drying. Don't expect him to give his best example of workmanship when he has to do his work amid the dust of the carpenters whom he is following up. His duty is to cover the defects in the work of those who have prepared the surface for him, to increase the beauty of your design, and to secure a protective coating against time and decay. Surely it is worth while to give him a fair chance to do his best.



GENERAL EXTERIOR VIEW



GROUND FLOOR PLAN

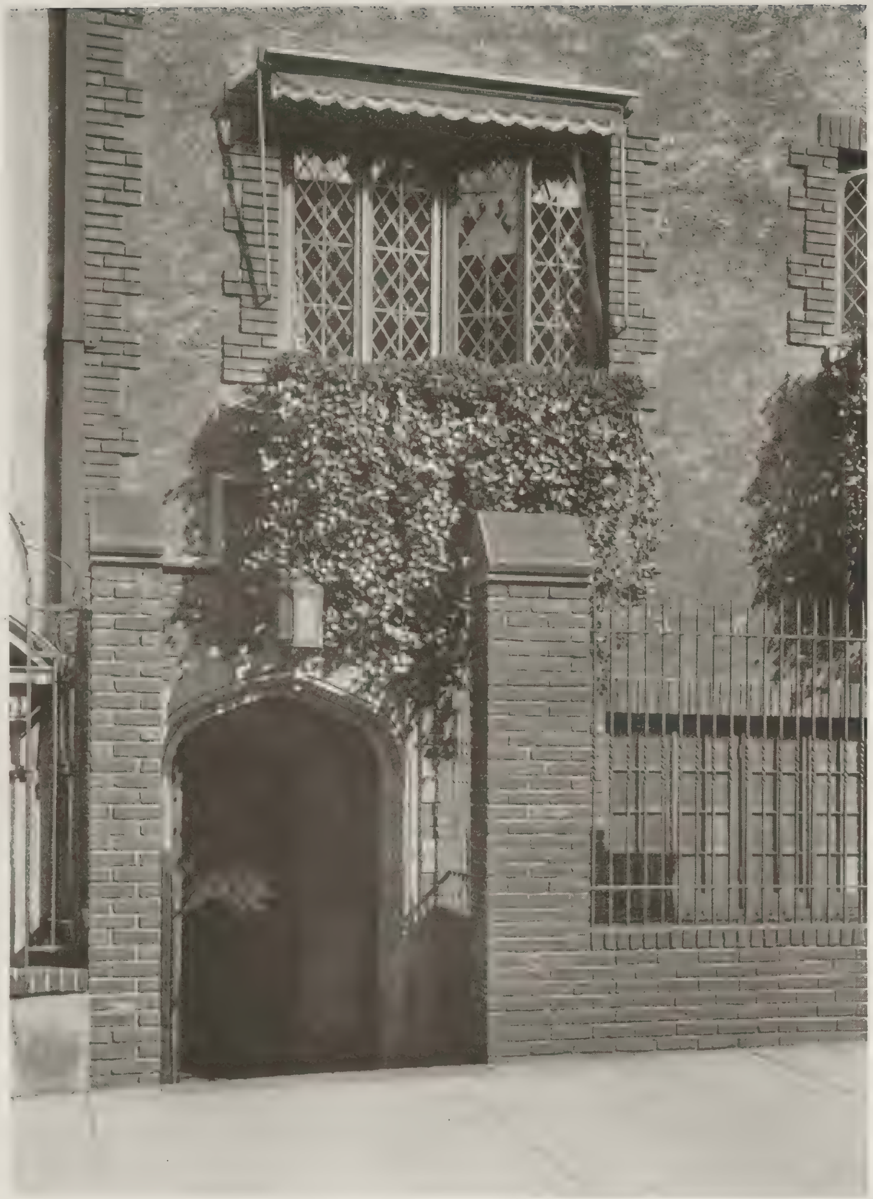


FIRST FLOOR PLAN

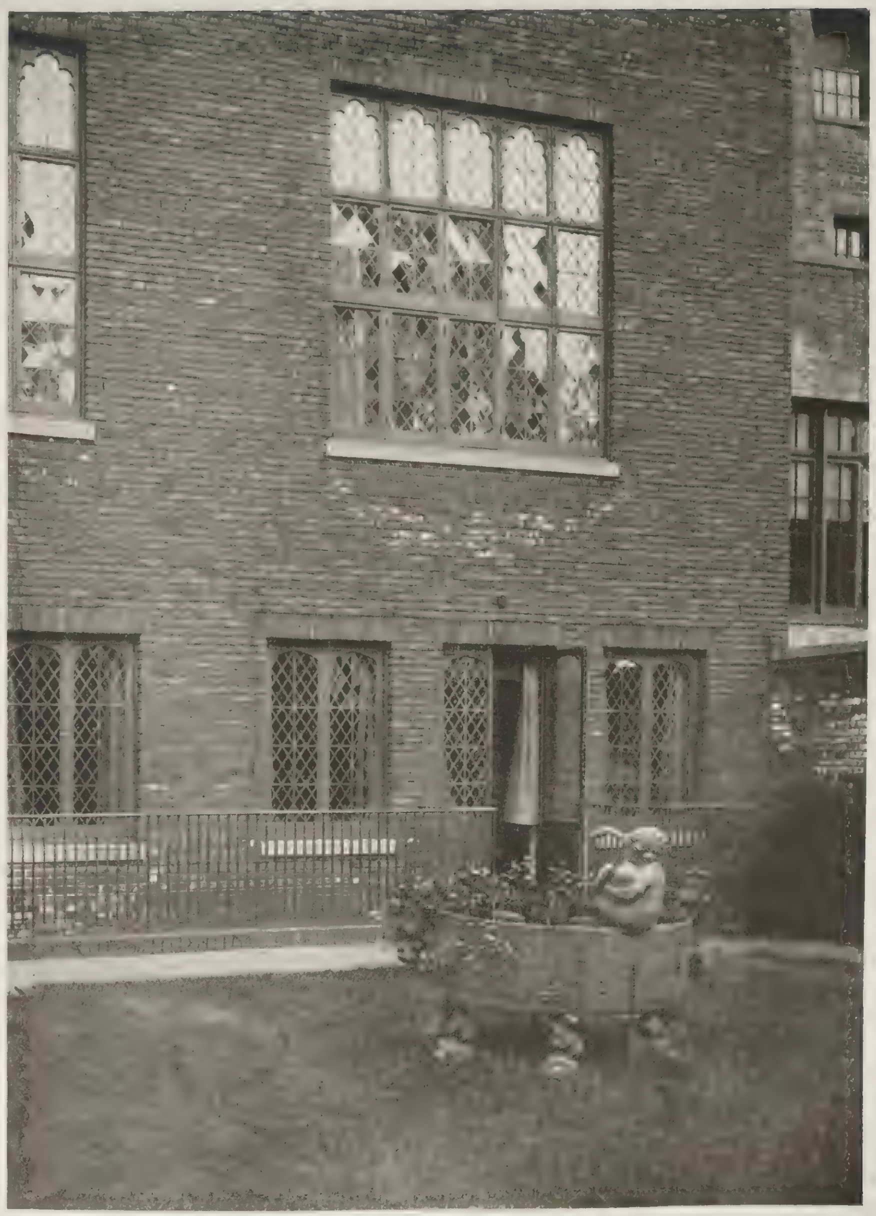
HOUSE OF MAURICE BRILL, ESQ., NEW YORK

FREDERICK STERNER, ARCHITECT

*Photos, Schuyler Carteret Lee*

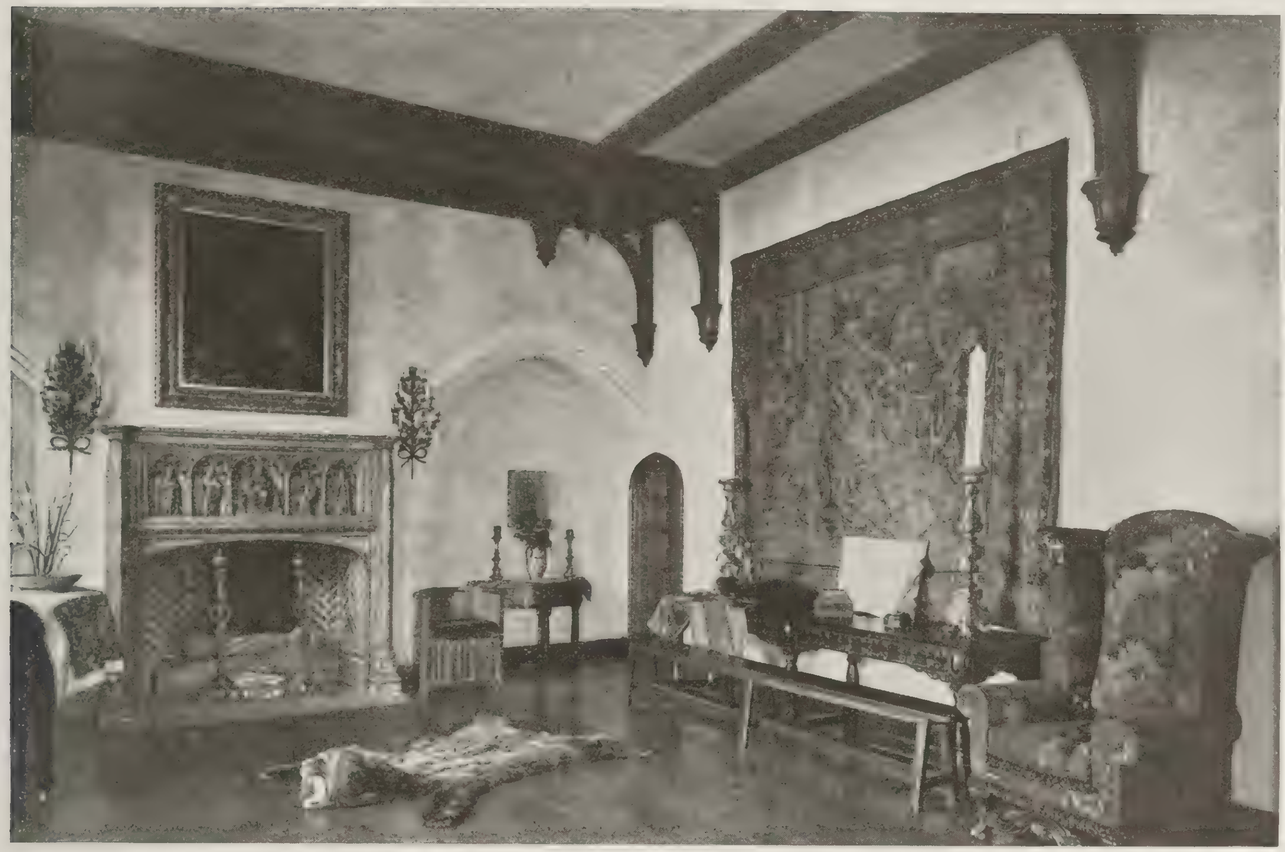


DETAIL OF ENTRANCE

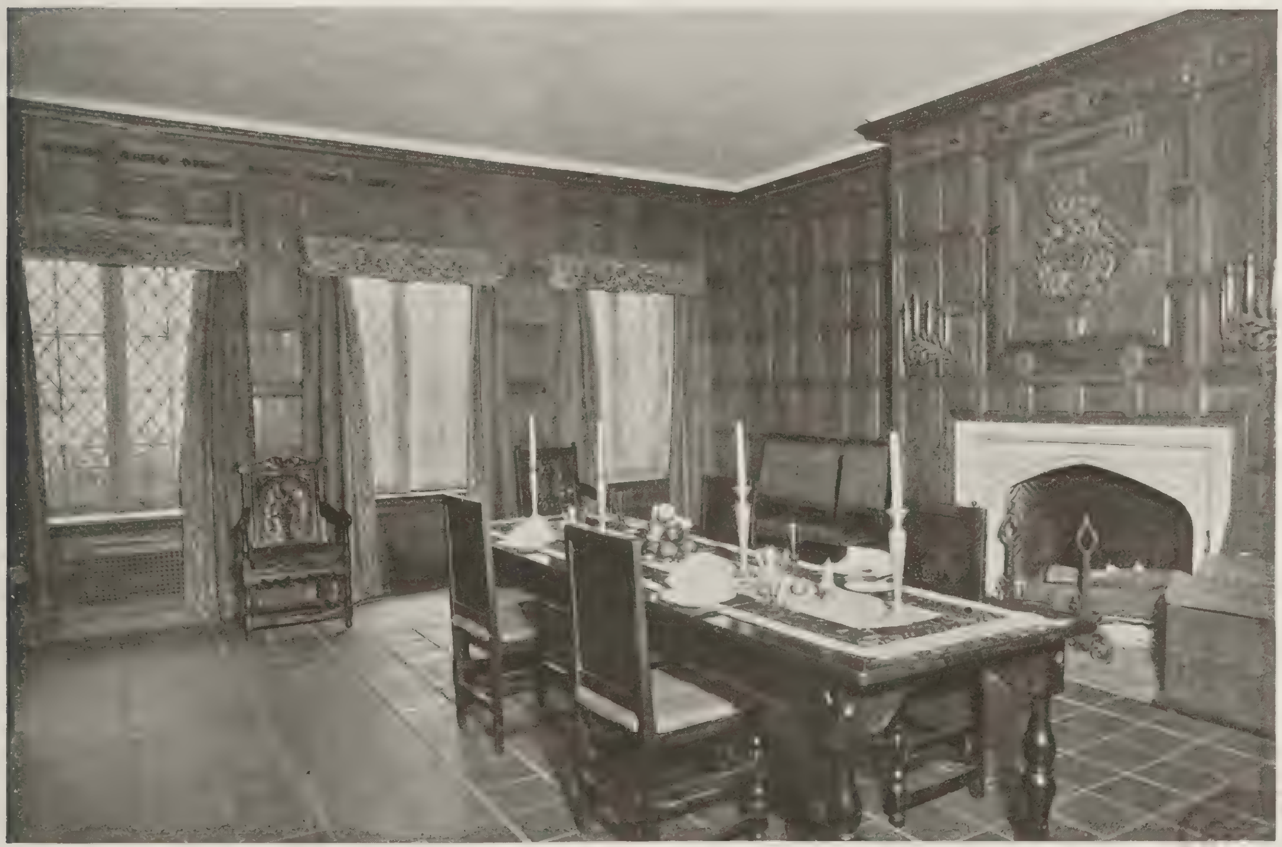


DETAIL FROM GARDEN

HOUSE OF MAURICE BRILL, ESQ., NEW YORK
FREDERICK STERNER, ARCHITECT



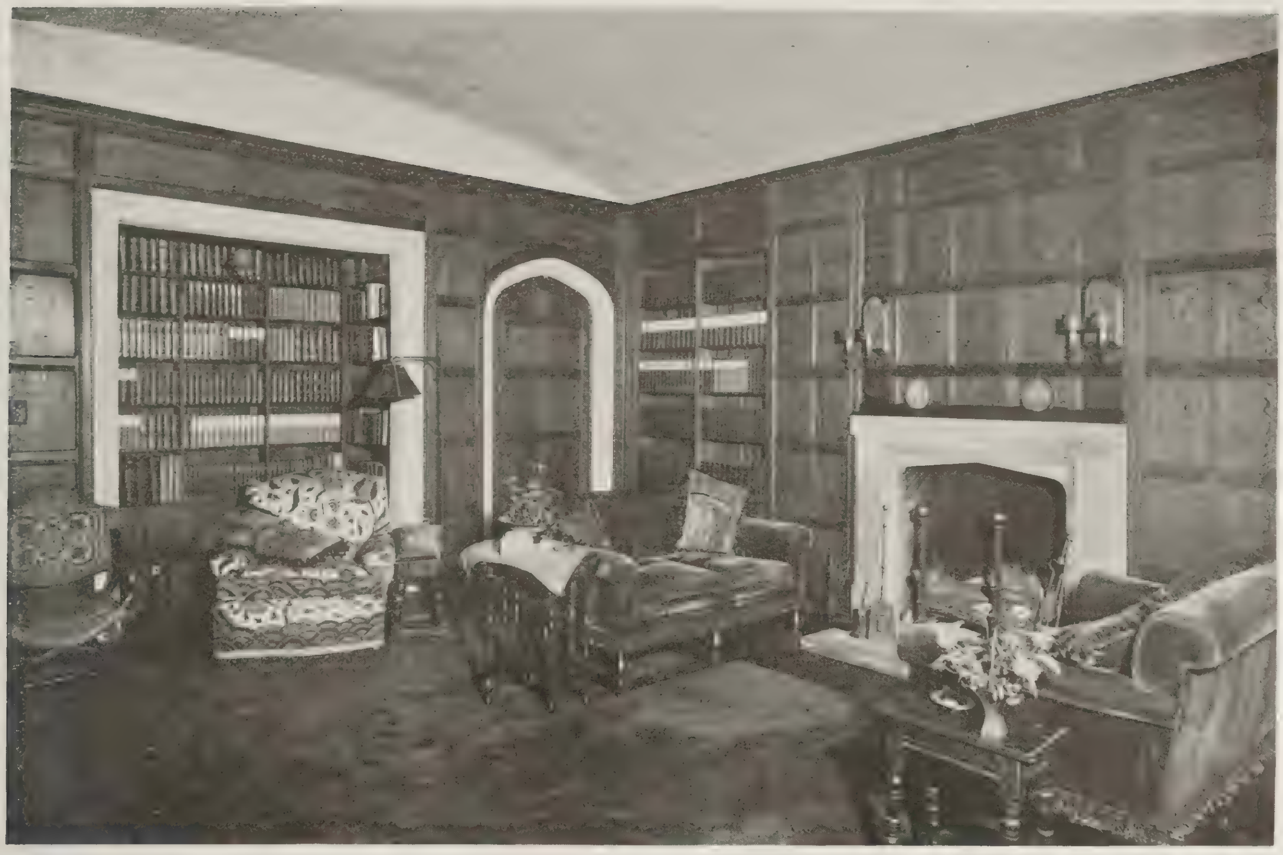
MUSIC ROOM

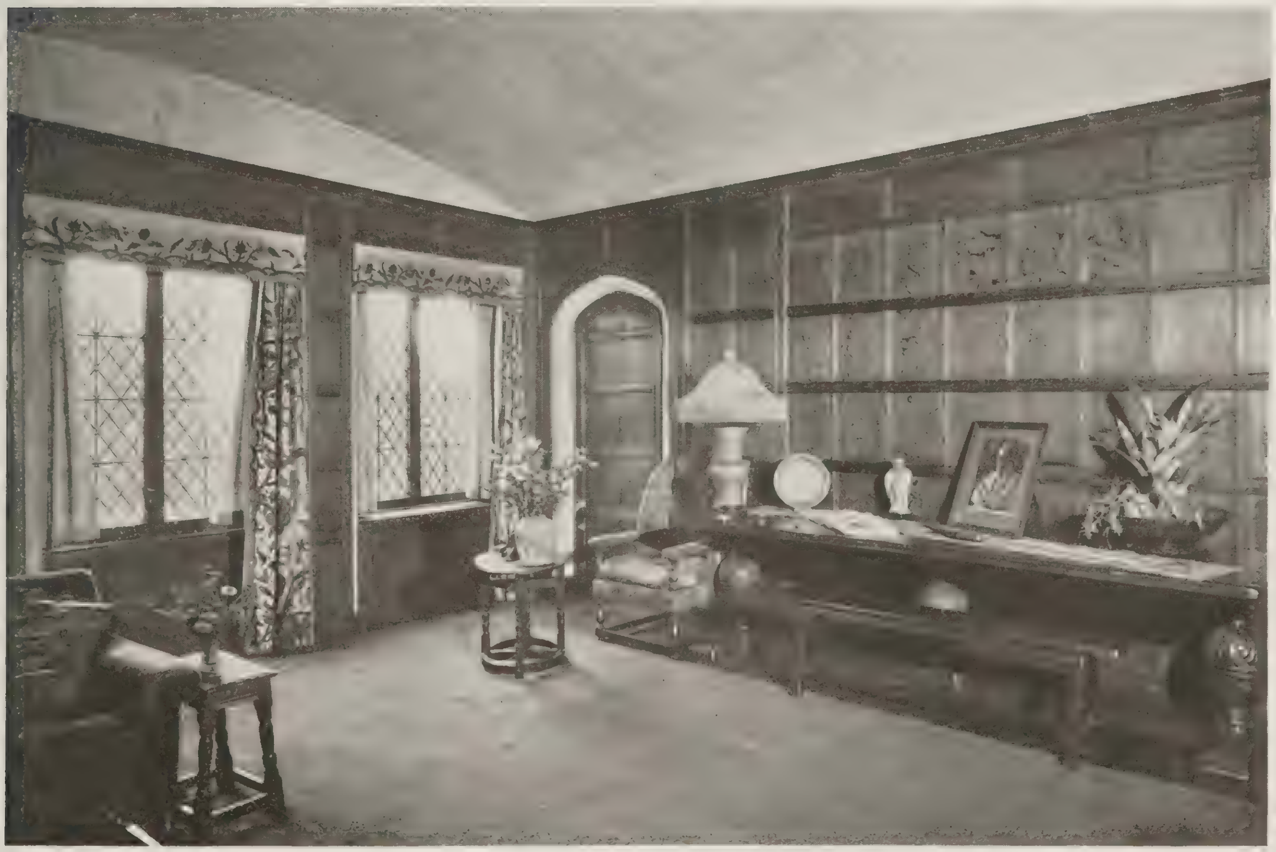


DINING ROOM

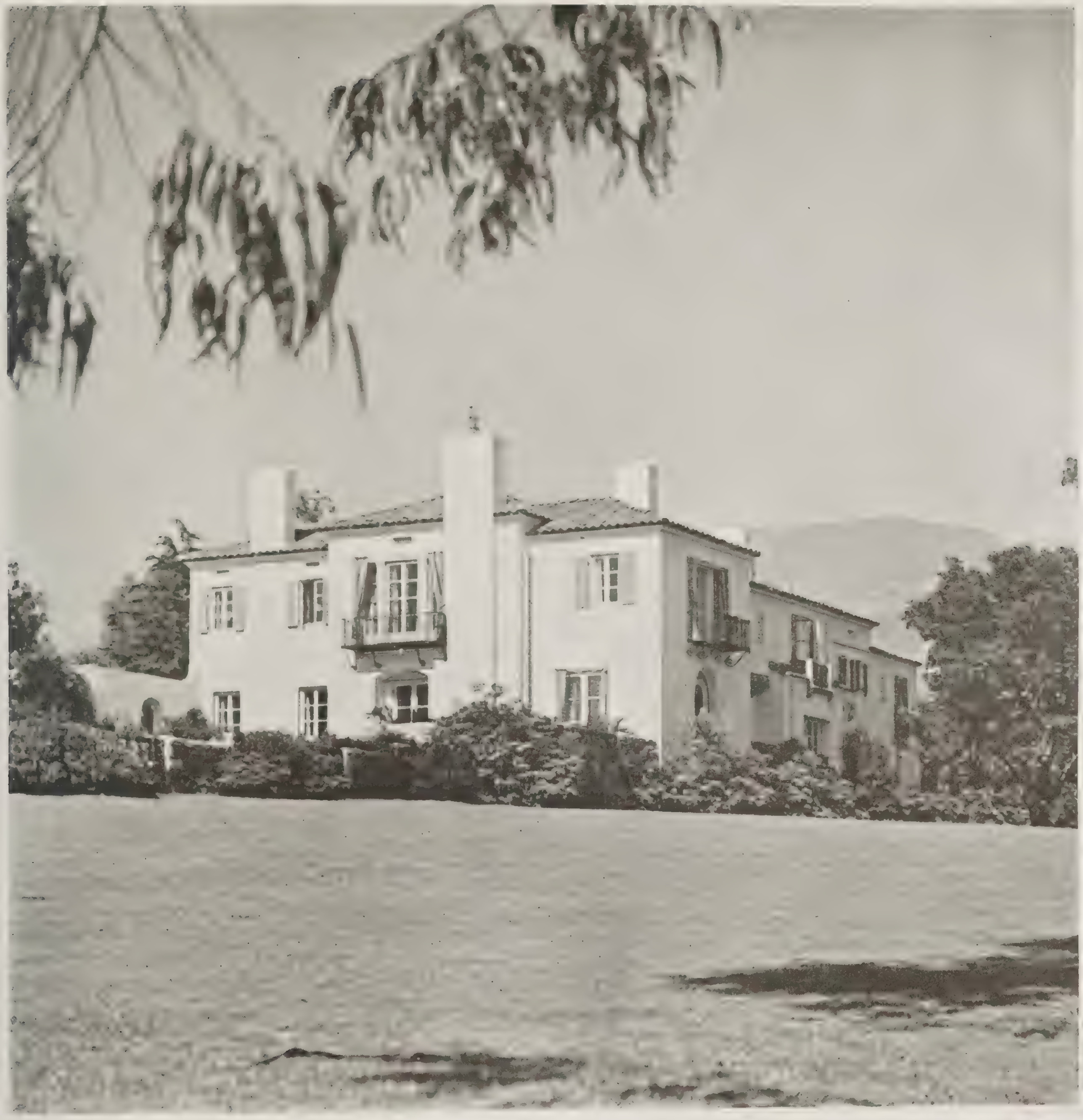
HOUSE OF MAURICE BRILL, ESQ., NEW YORK

FREDERICK STERNER, ARCHITECT

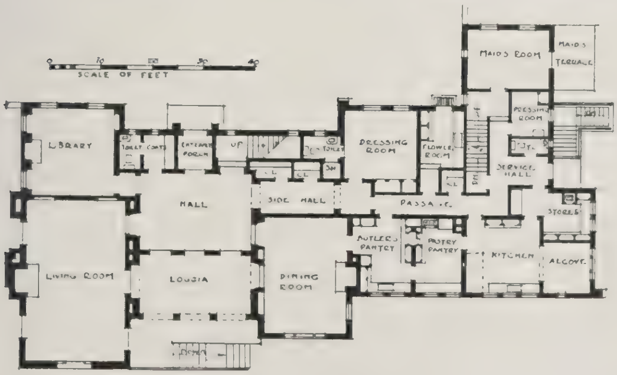




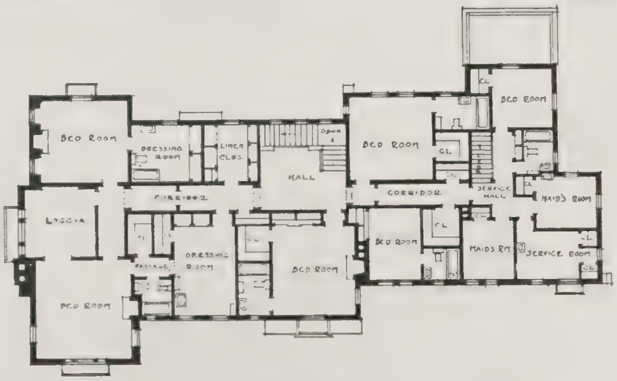
TWO VIEWS OF LIBRARY
HOUSE OF MAURICE BRILL, ESQ., NEW YORK
FREDERICK STERNER, ARCHITECT



VIEW OF GARDEN FRONT FROM LAWN



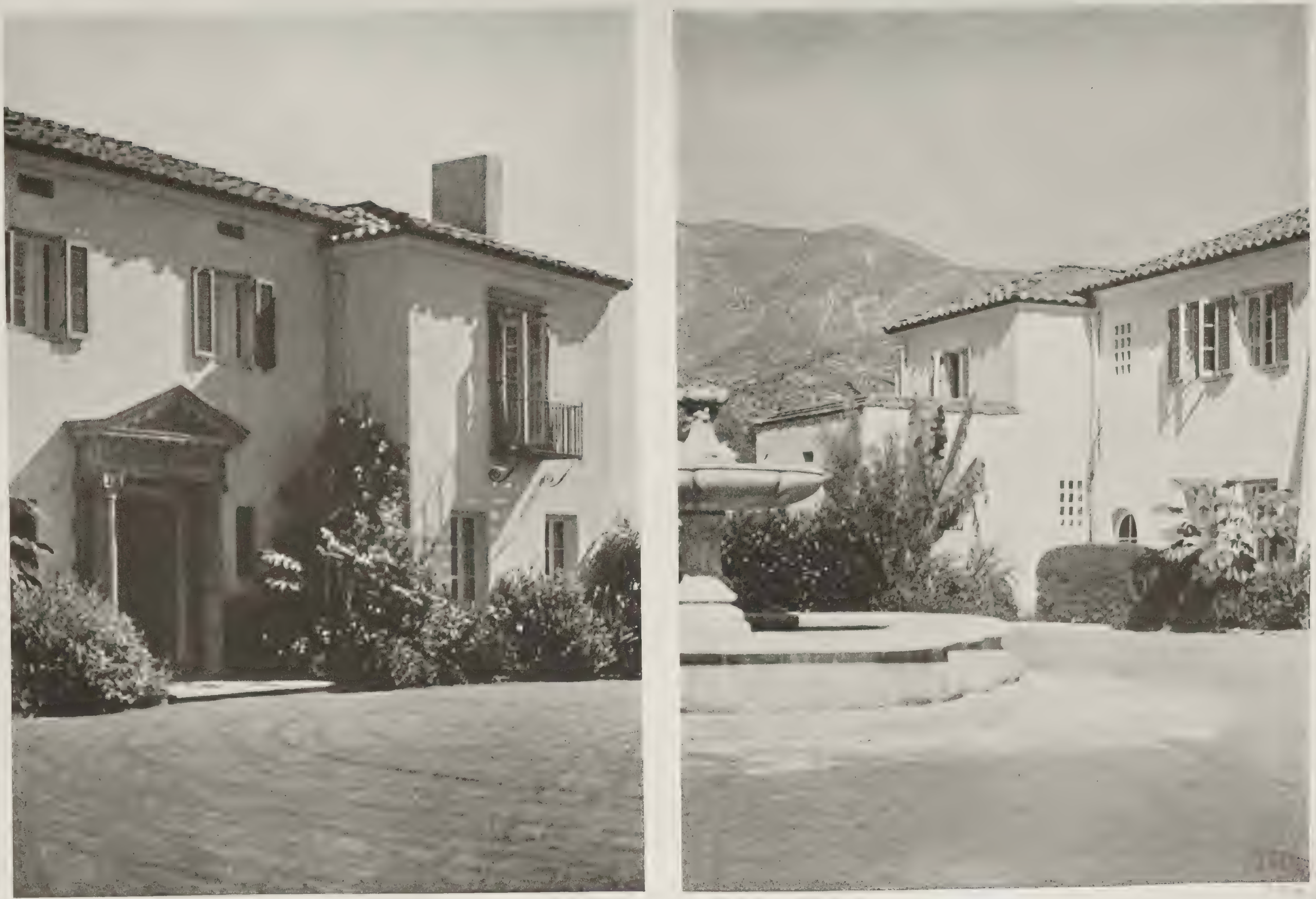
FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE OF EDWARD LOWE, ESQ., MONTECITO, CALIF.

JOHNSON, KAUFMANN & COATE, ARCHITECTS

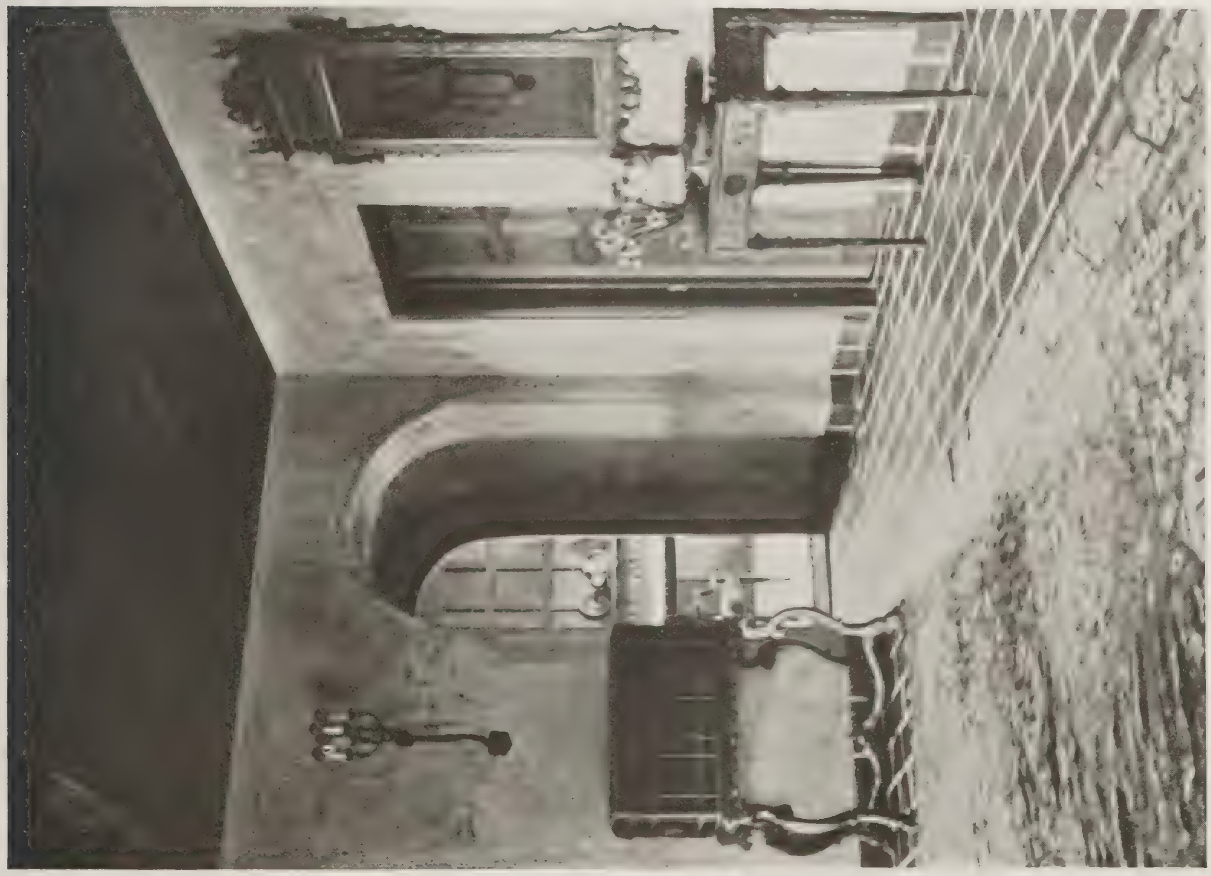


DETAIL OF ENTRANCE FRONT

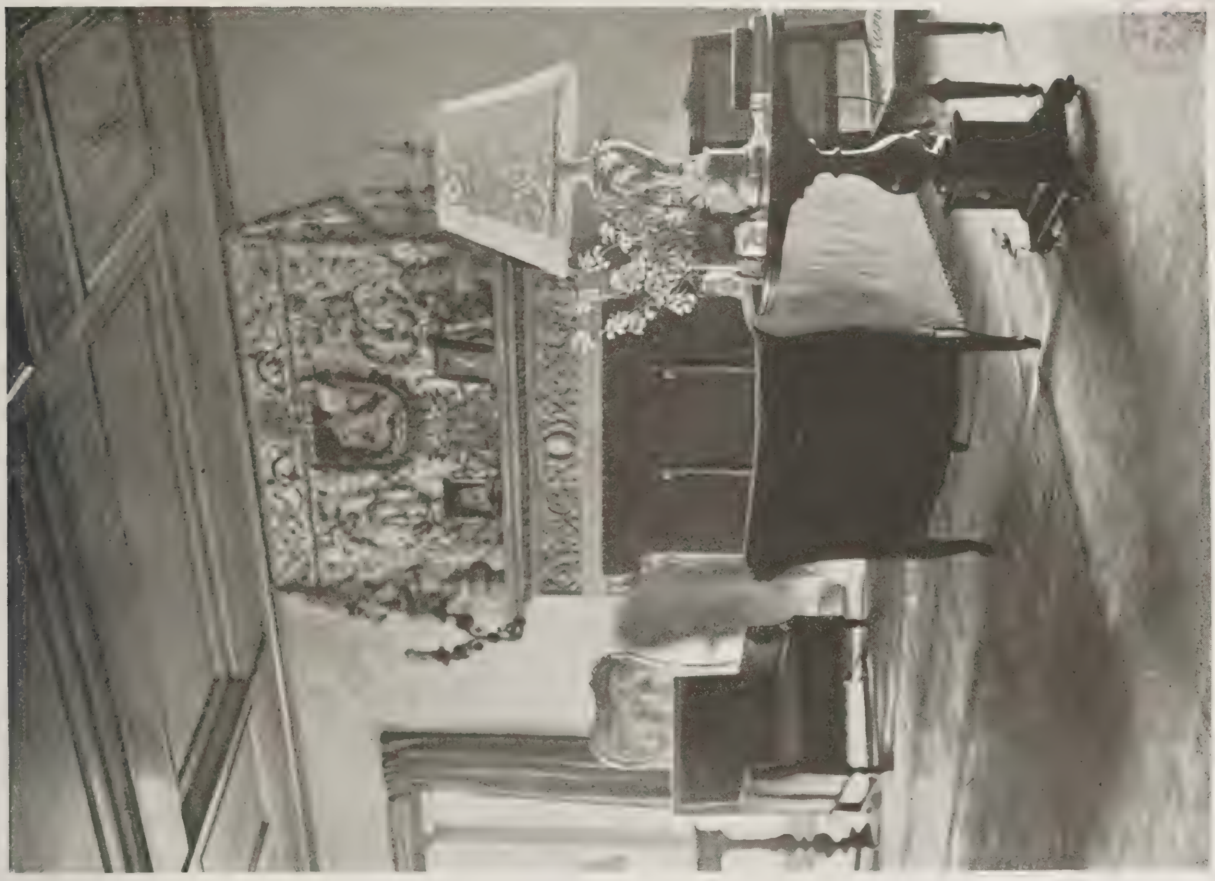
VIEW OF ENTRANCE FORECOURT

HOUSE OF EDWARD LOWE, ESQ., MONTECITO, CALIF.

JOHNSON, KAUFMANN & COATE, ARCHITECTS



HALL LOOKING INTO LIBRARY



MANTEL IN LIVING ROOM

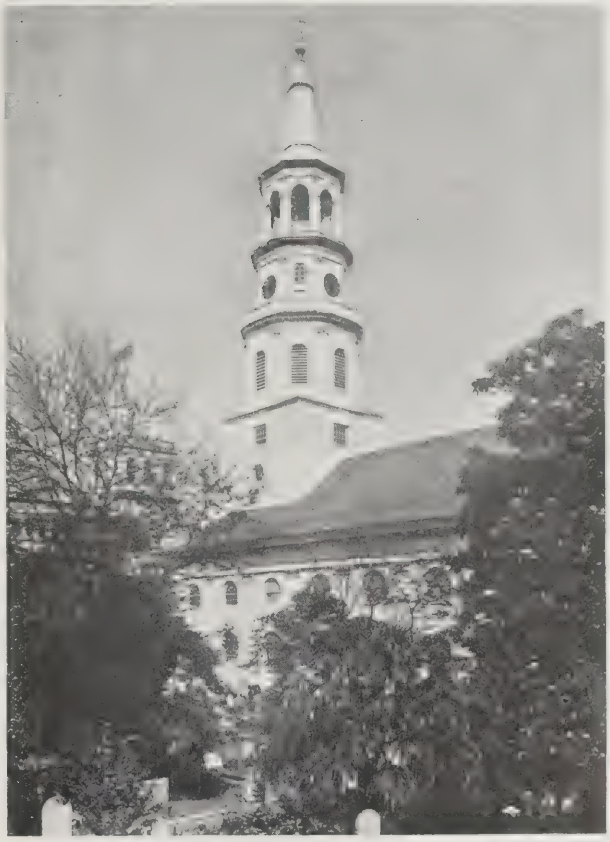
HOUSE OF EDWARD LOWE, ESQ., MONTECITO, CALIF.

JOHNSON, KAUFMANN & COATE, ARCHITECTS

# The Development of Charleston Architecture

## PART III—CHURCHES

*By* SAMUEL LAPHAM, JR., AND ALBERT SIMONS



St. Michael's Episcopal Church, Charleston (1752)

WE have followed, in the earlier articles of this series, the growth and trend of the architecture of the community in the domestic and civic types of buildings. In tracing the development of the ecclesiastical architecture we find a greater activity. Most of the religious bodies have lived through two, three or four generations of buildings. In the outlying settlements the original structures have survived in some instances, but in the mother settlement this has not happened. The first phase of ecclesiastical architecture was, in most cases, a small wooden structure, and decay, coupled with the rapid growth from a colonial outpost to the fifth city of the country (1670-1770) completely destroyed the primitive, non-permanent type of ecclesiastical building.

These primitive structures were replaced with the second phase of buildings—a permanent type as far as their materials would allow and built with the idea of lasting for generations. Today, however, many of the buildings are of the third phase—replacements, due to the destruction of the second phase by disaster,—fire, storm or earthquake. Five great conflagrations (1700, 1740, 1778, 1838, 1861), ten or more West Indian hurricanes, and the earthquake of 1886 have taken toll of all types of buildings. Also, besides the acts of God, the growth of the body politic within the church has often destroyed its own temple that it might build better for its needs. In addition, congregations have seceded, forming separate bodies, as well as rebuilding their original houses of worship, thus creating what may be termed the fourth phase.

This classification is not a fixed rule as regards time or details. Sects were established at different times, and cults varied in power at the times of their incorporation. It is given, as an attempt only, to outline broadly the general course of events as regards ecclesiastical structures, and in it are factors that are variables of the highest degree.

Turning now to the denominations and the oldest existing churches in the city today, we find that we can form the table given herewith. The dates given are, as far as possible, those of the laying of the corner stones.

With this table, limiting ourselves to the churches of today built before 1860, we see that the city has one church from the eighteenth century, seven of the nineteenth century from 1800 to 1840, representing in various degrees, the English renaissance type, and seven from the 1840-60 period, representing the classic and Gothic revivals. Other churches should be added to this list in its later periods to make it

| Church and Denomination of Today | 1st Phase | 2nd Phase | 3rd Phase | 4th Phase |
|---|---|---|---|---|
| St. Philip's Episcopal....... | 1681–90 | 1712 | 1835 | .... |
| St. Michael's Episcopal..... | .... | 1752(a) | .... | .... |
| St. Paul's Episcopal........ | .... | 1811(a) | .... | .... |
| Grace Church, Episcopal.... | .... | .... | .... | 1847(a) |
| French Huguenot .......... | 1681–90 | 1805–28 | 1844 | .... |
| Congregational (b) ........ | .... | 1729 | 1804 | 1867 |
| St. John's Lutheran......... | 1759 | 1816 | .... | .... |
| St. Mary's Catholic......... | 1789 | 1793 | 1838 | .... |
| First Baptist............... | 1699–00 | 1746 | 1822 | .... |
| Hasell St. Synagogue....... | 1750 | 1792 | 1840 | .... |
| First Presbyterian........... | 1734(c) | 1814 | .... | .... |
| Second Presbyterian......... | .... | 1811(d) | .... | .... |
| Westminster Presbyterian.... | .... | .... | 1850 | .... |
| Bethel Methodist........... | .... | 1797(e) | 1853 | .... |
| Spring Street Methodist..... | .... | .... | 1858(e) | .... |
| Unitarian ................. | .... | 1772(f) | 1852 | .... |

(a) Offshoot of St. Philip's Episcopal.

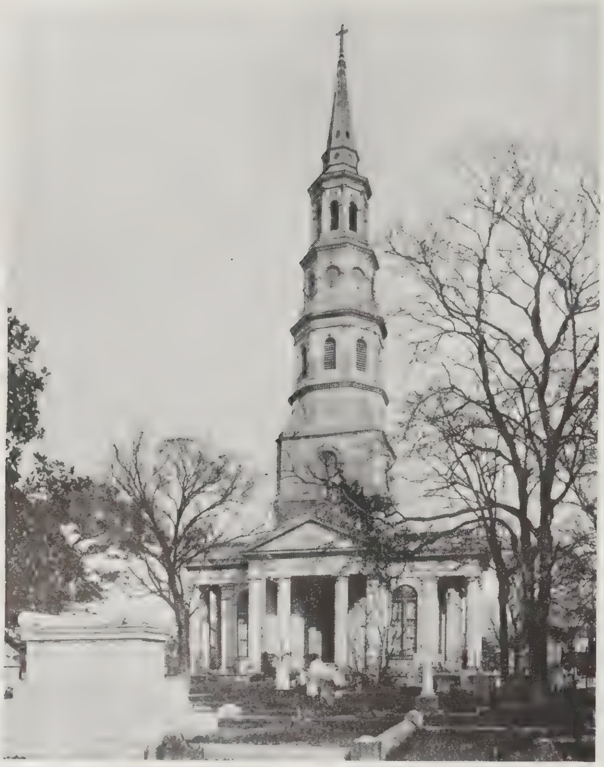
(b) Originally Presbyterian, becoming Congregational with withdrawal of Presbyterians in 1734.

(c) Formed by withdrawal mentioned under (b).

(d) Offshoot of First Presbyterian.

(e) Descendant of Cumberland Methodist Church (1787), third phase of which was burned in 1861.

(f) Originally branch of Congregational Church.



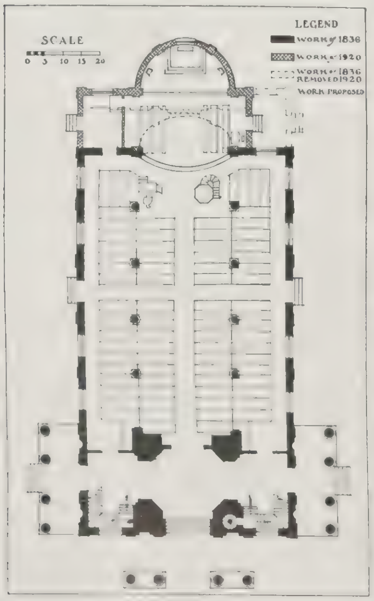
St. Philip's Episcopal Church, Charleston (1835)

a full summary of the ecclesiastical architecture, but the present table is intended to be representative and nothing more.

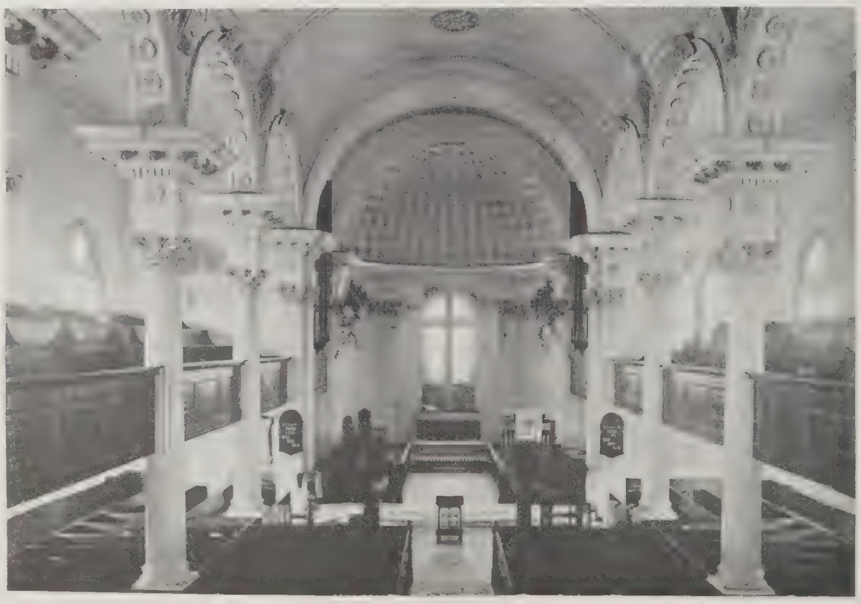
Of these 15 churches, St. Michael's is the oldest, being built in 1752-61. Its history is so entwined with that of St. Philip's as to demand explanation, and therefore the architectural history of the two churches of today will be treated in sequence.

The original parish in which the town lay was given the name of St. Philip's Parish, and on the site of the present St. Michael's, the first St. Philip's Church was built between 1681 and 1690. Of black cypress on a brick foundation, it was in a state of decay by 1720. The Church of England being established by law, the assembly therefore ordered the construction of a brick church—the second St. Philip's—on a site three blocks to the northeast of the first church. This was started in 1712, opened in 1723, and the first St. Philip's torn down in 1727. The site of the latter was left vacant and, for the next quarter-century, the St. Philip's of 1723 was the established church of the colony. But the growth of the population made a second place of worship of the Church of England necessary, and in 1751, by act of assembly, the southern portion of the town was taken from the Parish of St. Philip and made into the Parish of St. Michael, and a church authorized for the parish, to be erected on the vacant site of the first St. Philip's Church. Here the history of the origin of the two ends, and we will first consider St. Michael's Church, leaving the St. Philip's of 1723 and its descendant of today to be dealt with afterwards.

It took nine years to complete St. Michael's Church. The assembly authorized it on June 14, 1751, and the corner stone was laid on February 17, 1752, by the Royal Governor Glen, assisted by the board of commissioners for the building, on which appear the famous revolutionary names of Rutledge and Pinckney. The *South Carolina Gazette* of February 22, 1752, gives us an insight into the ceremony of the laying of the corner stone, which if practiced today would do much to smooth the path of the architect and the building committee. We find that the governor laid the corner stone, then each of the commissioners and each of the gentlemen accompanying the governor laid one stone



Plan Showing Changes



Interior of St. Philip's Episcopal Church, Charleston

Main Church, J. Hyde, Architect, (1835); Choir and Chancel, Simons & Lapham, Architects, (1920) apiece. After this exhausting work, the company adjourned to Mr. Gorden's (a tavern), "where a handsome Entertainment was provided by the Commissioners." The bill is preserved, and the items which made up the total are of interest:

Feb. 17, 1752—The Commissioner of the Church Bill

| | |
|---|---|
| Dinner | 20:0:0 |
| To Tody | 1:10:0 |
| " Punch | 5 :0:0 |
| " Beer | 5:10:0 |
| " Wine | 5: 5:0 |
| " Glass Broak | 5:0 |
| " 8 Magnum Bonos of Clarret | 24: 0:0 |
| | 61:10:0 |

Apr. 13, 1752. JOHN GORDEN.

The *Gazette* continues . . . "Dinner over, His Majesty's Health was drank, followed by a Discharge of Cannon at Granville's Bastion; then the Healths of all the Royal Family and other loyal Toasts; and the Day was concluded with peculiar Pleasure and Satisfaction."

Second Presbyterian Church (1811)

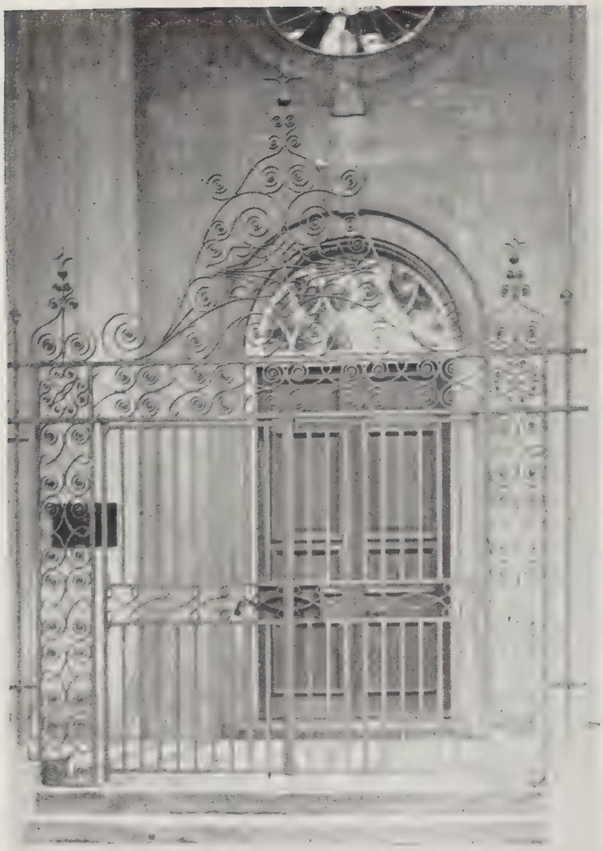
In regard to the architect, the *Gazette* says further . . . "The Church is built on the Plan of one of Mr. Gibson's Designs. . . ." The Gibson mentioned has sometimes been confused with James Gibbs, the English architect; but records in the possession of descendants prove conclusively that this Gibson was a Scotch engineer who had not long previously come to this country. The building is too well known and has been too often dealt with to warrant describing its details here. Its plan, etc., will be found in "The Georgian Period." In size, 60 by 130 feet, of stucco-covered brick, it has survived storm, fire and cannon shots. After the earthquake, by comparison with measurements taken in 1832, it was found that the 186-foot steeple with its huge brick foundations had sunk 8 inches. Great rifts were torn in the walls and in the pediment roof of the Doric porch where they joined the tower, but all retained their equilibrium and could be joined together again. The final cost in 1761 is given as £53,535, equivalent to $32,775. Documentary papers of those days show that in values of today bricks were then $3 a thousand, mechanics got $1.40 a day, and laborers 70 cents a day.

Returning to the St. Philip's of 1723, we find that with its completion it became the heart of the colony. Within its walls elections were held for the commons assembly, and municipal offices were given to its vestry by virtue of their position as vestrymen. Beside its walls today lie most of the glory, the pomp and the strength of our colonial past—for there are the undisturbed graves of commissioners of the Church of England, governors and councilmen and simple citizens who faced the Spanish attack of 1686, the French fleet of 1706, and the buccaneers of 1718.

Of the church itself, on whose foundation the present building stands, we have Dalcho's description of the interior (1819), the paintings now hanging on the vestibule walls of the church of today, and two old engravings of the exterior. Rich in tradition, the second St. Philip's stood for 112 years. The great fires of 1740 and 1778 spared it; twice in 1744 lightning struck it without doing much injury. In 1835 a small fire in the neighborhood ignited the upper portion of the steeple, and the whole structure burned slowly downwards to the ground to the grief of the whole community, regardless of denomination. It was the cause of public mourning.

A new church on the old foundations was at once started, the corner stone being laid in November of 1835, and the church consecrated in 1838. The architect is recorded as "J. Hyde," the steeple being added later by E. B. White. The new building was at first intended to be a reproduction of the old, but the vestry realized that certain defects had previously existed and should be avoided in the new building. As the result, while the exterior is similar to the church of 1812 with the exception of the spire, the interior differs considerably from the earlier phase.

Suffering from bombardment in 1863 and the earthquake of 1886, the building was carefully repaired each time. In May, 1920, after an interval of 76 years, lightning again struck the church and damaged the eastern end. This occasioned the decision for an extension as well as repairs, and the authors of this article were entrusted with the task. The accompanying plan and illustration show both the old and new work. The shallow elliptical sanctuary, projecting through the east wall, was removed, the great elliptical arch in the wall being given a semi-circular form, concentric with the ceiling curve; an extra bay for the organ and choir was added, beyond which, supported by another great arch, was erected a semi-circular sanctuary. The detail of the old ornament was carefully repeated, the coffers and rosettes of the dome being restudied as the greater curvature demanded more panels. The cherub heads over the new side arches were made by making moulds from one of the existing heads taken down for that purpose. On the back of this head was found a label, showing that at least part of the plaster ornament was imported in 1835-38. Printed on brown paper, it reads: "From



Wrought Iron Gate (1823), St. John's Lutheran Church, Charleston (1816)

Measured Drawing Opposite

Charles F. Bielefeld, Manufacturer, 18, New Road, Fitzroy Sq., London," proving its foreign origin.

The remaining existing churches of the period from 1800 to 1840 are all similarly of the Wren type, varying somewhat in each particular church, but all having colonnaded porticoes and steeples in which the influence of the different London parish churches from the hands of Gibbs, Wren and others is quite apparent. The spires, often added after the completion of the buildings, vary according to the skill and taste of the designer and the extent of the funds of the congregation.

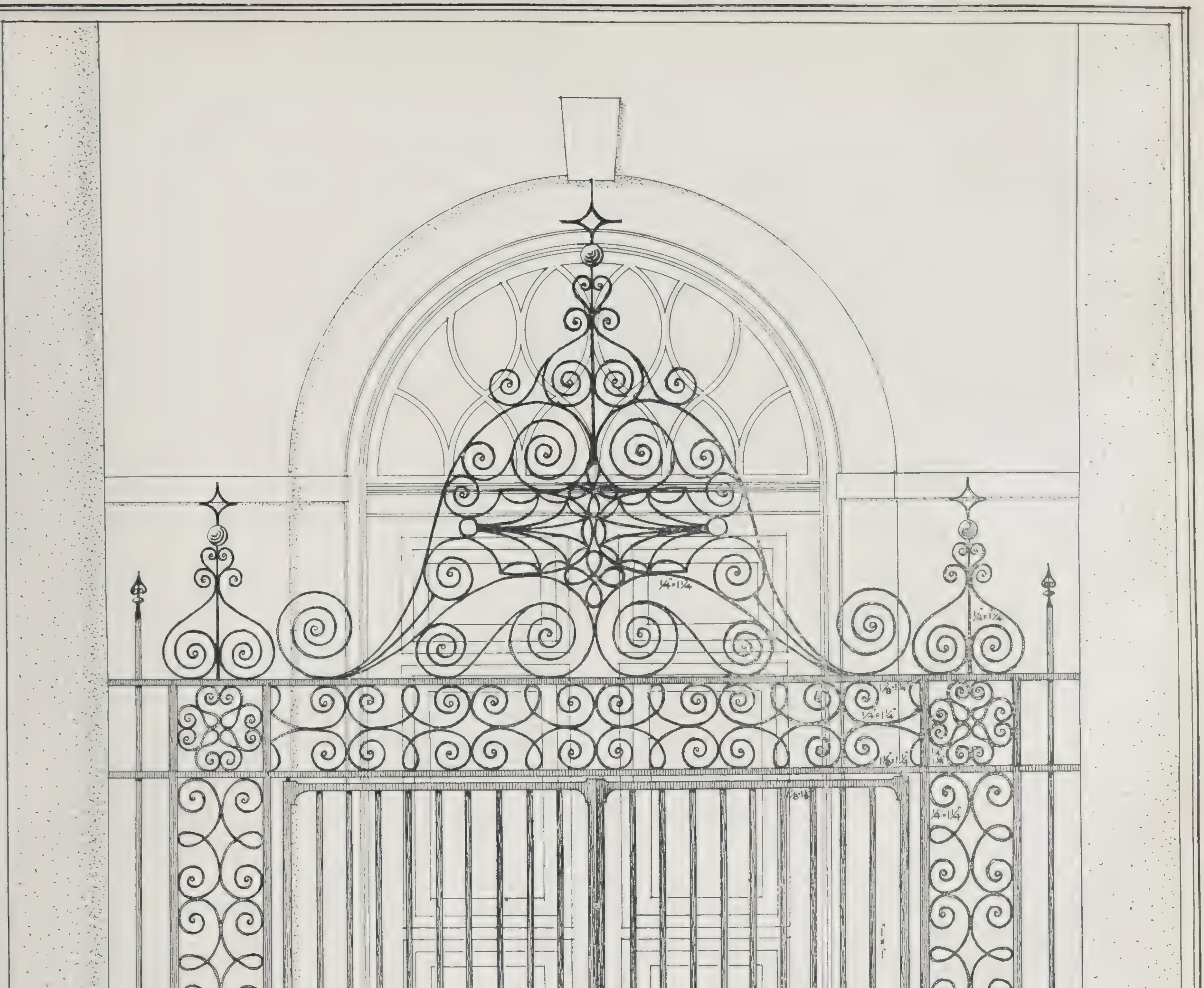
An important step in the sequence of styles has been lost through the burning in 1861 of the Congregational Circular Church of 1804. This was the work of Robert Mills and was probably his earliest individual effort. It was in the form of a rotunda, having a dome and lantern; a square projection abutted on the street side with a portico of six columns and a steeple—added later—similar to that of the St. Philip's of 1835. The building was noteworthy because Mills claims that its was the first dome built in America, and that he recommended Greek Doric proportions for the portico at this early date—a suggestion which, however, was not adopted.

The First Presbyterian Church (1814) is the only representative of the two-spired type. The Second Presbyterian Church (1811) is on standard lines, though its steeple was never carried above the second stage of its height. This stage, like those of St. Michael's, St. Philip's and the First Presbyterian, is octagonal, ornamented with Ionic pilasters. The lack of a spire, while felt, is not entirely a loss, as it gives to the building a feeling of restraint and a severe simplicity in keeping with its lines and purpose. Legend has preserved the rumor that the omission of the steeple was due to the fact that the contractors were paid on the basis of the number of brick laid and that the funds were exhausted in the unnecessarily thick walls by the time the base for the spire was completed. The walls bear out the legend in their extreme thickness, as those of the upper tower stage are of brickwork, 6 feet thick.

St. John's Lutheran Church (1815-18), incorporated in 1783 as "The Lutheran Church of German Protestants," varies the design of its spire from those of contemporary churches. This and its ornamental iron gates (1823) are its chief points of note. The gates were made by members of the congregation, among whom were the best wrought iron craftsmen of the city, and were plainly a labor of love. Although less well known they are the equal of any of the other masterpieces of wrought iron work in the city. The accompanying measured drawing shows one of the three gates of the same design that form a screen between the columns of the portico. Besides these the churchyard is enclosed by an iron fence with a fourth gate of equal scale and richness.

In 1809, a movement was made towards the forming of a third Episcopal congregation, as St. Michael's and St. Philip's were becoming inadequate. This movement was stopped by the operation of the "Embargo and Non-Intercourse Act," but in 1810, a number of the members of the two parishes obtained the use of the "Old French Church" and formed the "Third Episcopal Congregation." They determined to build a new church, and receiving donations of land in the northwest portion of the city, started the erection of "St. Paul's Church, Radcliffeboro." The corner stone was laid November 19, 1811. The brickwork was executed by James and John Gorden, their plan for the church being accepted. The carpenter work is recorded as being by Robert Jackson and Robert Galbraith. The church was consecrated on March 28, 1816.

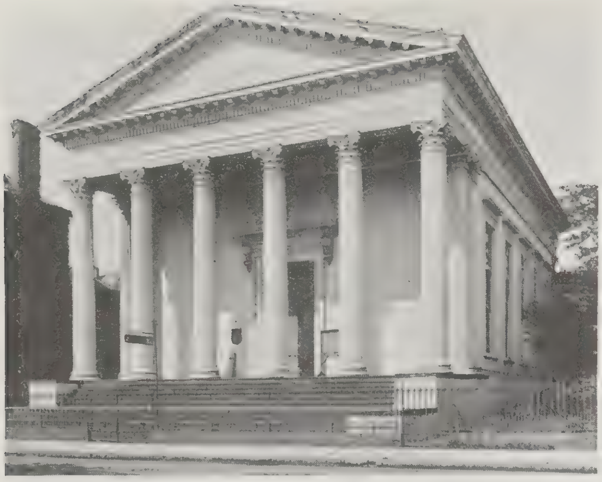
In the building of the church the congregation was doubtless ambitious to surpass the older churches in size and elegance, the body of the church being 70 by 90 feet. Like them, it was to have a lofty steeple, but after the lowest stage had been erected, some settlement occurred, and the builders considered the bearing strength of the soil insufficient for a tall steeple. The walls of the square truncated tower were, therefore, finished off with battlements and pinnacles and ornamented with quartrefoils moulded in relief. In this rather unexpected change of style to meet an unforeseen situation, we find perhaps one of the earliest adum-



IRON GATES WROUGHT IN 1823
SAINT JOHN'S LUTHERAN CHURCH
CHARLESTON, S.C.

SCALE: ½ INCH EQUALS 1 FOOT

MEASURED AND DRAWN BY ALBERT SIMONS



Westminster Presbyterian Church (1850)

brations of the Gothic revival as applied to church buildings. The interior of St. Paul's exemplifies the application of the prevailing Adam motifs to ecclesiastical purposes, the general effect being at once light and spacious. The very slender proportions of the gallery columns and the delicately carved woodwork of the tablets in the chancel add much to the general effect of elegance and scale.

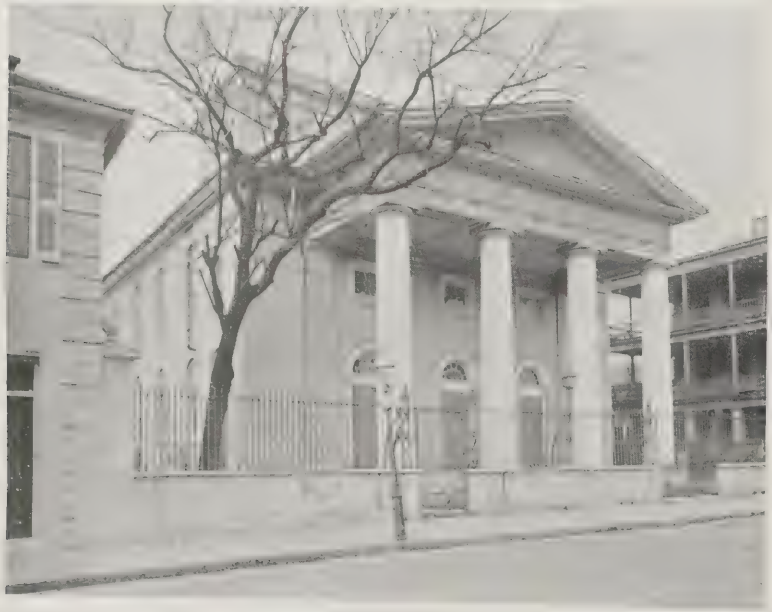
The First Baptist Church (1822, by Robert Mills) gives us in its turn the first hint of the Greek revival, although the body of the church is still English renaissance in its proportions and openings. The Greek influence is found in the omission of the steeple entirely, the encircling of the building with a Greek Doric entablature, and in the giving to the unfluted portico columns massive proportions that were neither Greek nor Roman. Mills was very much pleased with his introduction of the new style and thus records his approval of his own work: "The Baptist Church of Charleston exhibits the best specimen of correct taste in architecture of the modern buildings in the city; it is purely Greek in its style, simply grand in its proportions and beautiful in detail."

St. Mary's Church is more interesting for its history than for its architecture, being the mother church of the Roman Catholic faith, not only for Charleston but for the Carolinas and Georgia. There were but few Catholics, mostly Irish, in Carolina before the revolution, and it was not until 1790 that the clauses excluding them from holding office were stricken from the state constitution.

The ground for St. Mary's was first purchased for Catholic use in 1789. Catholics being few in number, we find that "it was suggested that perhaps either the court of Spain or France might establish in Charleston a Catholic chaplain, since many vessels, carrying the flags of those countries frequently visited here." This was not effected, however. After the French revolution and the Santo Domingo uprising the number of Catholics increased, due to immigration of refugees to the city, and in 1793 a brick church replaced the previous wooden structure and was used until destroyed by the fire of 1838. The present building, 50 by 84 feet, took its place, its corner stone being laid on August 15, 1838. Much havoc was wrought in 1863 by the shells from the federal fleet, throwing down the great picture of the crucifixion over the altar and wrecking the organ.

In the adjoining cemetery of the church, on lichen-covered slabs, Irish and French names appear side by side in marked contrast. Below a coronet and coat of arms we read this epitaph:

> "Underneath lie interred the bodies of D'lle Amelie Maxime Rosalie De Grasse, deceased on the 23rd day of August, 1799; and of D'lle Melanie Veronique Maxime De Grasse, deceased on the 19th of September, 1799, daughters to the late Francis Joseph Paul, Count De Grasse, Marquis of Tilly, of the former Counts of Provence and Soverign Princes of Antibes, Lieutenant-General of the Naval Army of His Most Christian Majesty, Commander of the Royal Order of St. Louis, and member of the Military Society of Cincinnati."



First Baptist Church, Charleston (1822)

Thus in the broad fellowship of a common faith, beside the ashes of humbler folk, sleep these noble ladies of the ancient regime.

Heralded by the First Baptist Church, we find in 1840, the classic revival established as the accepted manner for the churches of Charleston. The day of steeples had passed, and the classic temple was always held in mind when a church was under consideration.

Of the more correct Greek Doric examples, the best are the Hebrew synagogue (1840-43), of the Parthenon type, beautifully executed in detail and proportion, and the Bethel Methodist Church (1853), of the more archaic, massive type of church architecture.

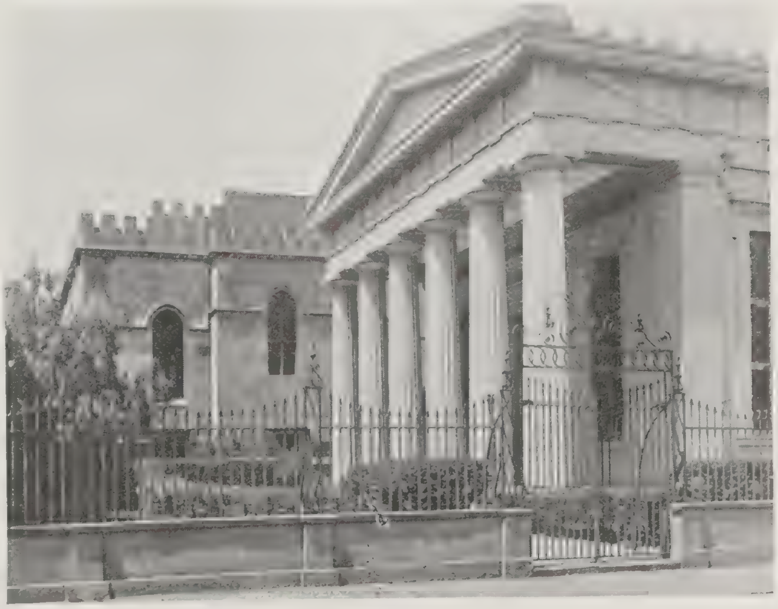
The earliest Jews in the colony came from Spain, and their first recorded meeting in Charleston was in 1750. The name of this congregation was, as it is now, "Kahal Kadosh Beth Elohim," "Holy Congregation of the House of Israel." The members were strictly orthodox, and the mode of service was in accordance with the Portuguese custom. Their first permanent synagogue was built in 1792, "Messrs. Steedman and Horlbeck being the contractors, the building with the ornamental work and cupola to cost $20,000." The corner stone was laid according to the rites of Freemasonry. This building perished in the fire of 1838, and the present synagogue was built the same year. Mr. Warner of New York was the architect, and David Lopez, the contractor. The detail work and finish is particularly fine throughout. The synagogue is 56 by 95 feet, the columns being four feet in diameter; height to the apex of the pediment, 46 feet; the door 18 feet high, 9 feet wide. On the interior, the gallery is supported by an Ionic order modeled after the Erechtheum and the covering for the Ark is supported by ten columns and *antae* of the Corinthian order after the monument of Lysicrates.

The classic Corinthian temple is best represented by the Westminster Presbyterian Church (1850) and the Spring Street Methodist Church (1858). The former is the more carefully proportioned, its great doorway being a magnificent piece of work, and the whole having an atmosphere of sanctity that is seldom obtained in the more severely classic types. It suffers in common with all Greek and Roman temples adapted to church use by the necessity of having side lighting in order to conduct its ceremonies, a requirement that did not exist in the classic prototypes. This problem the designers solved by inserting huge side windows, framed in Græco-Roman mouldings, as the best solution, but it is one that in every case detracts from the structure. The Spring Street Methodist Church suffers even more from this failing, as its podium, in addition to the side walls, is pierced to give light to a basement floor.

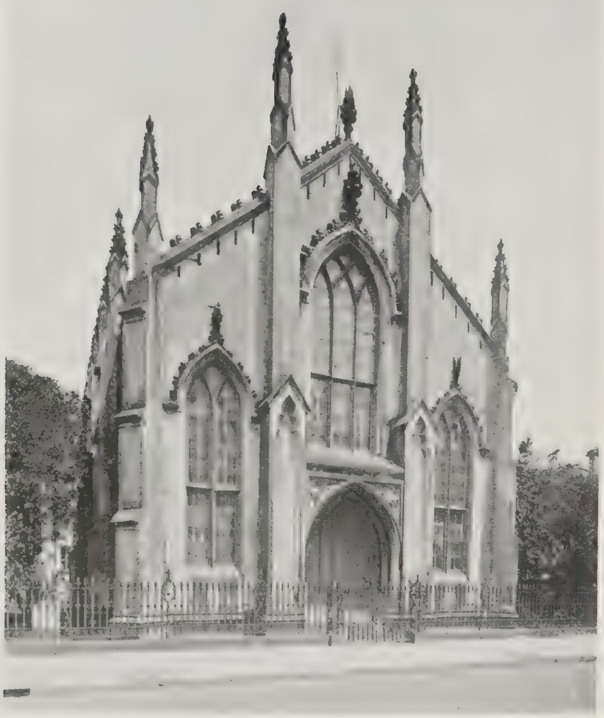
In 1844 we have another influx of style — the Gothic revival — whose earliest use is found in the hands of two architects, E. B. White, frequently mentioned in this series, and Frank Lee. Both, however, used Gothic elements more as an outward form producing a more or less closely simulated Gothic architecture than as a system of construction. Behind their ribbed, vaulted ceilings of lath and plaster are the familiar rafters and trusses that had been used in the classic churches. White first introduced the style in his rebuilding of the Huguenot Church (1844), and Lee in the Unitarian Church of 1852. This introduction of Gothic is of interest when one realizes that the dates given are quite as early as those of Trinity Church, New York (1843, by Upjohn), and Grace Church, New York (1858, by Renwick), which designs have generally been regarded as representing the genesis of the Gothic revival in America.

The Huguenot Church was founded by the French refugees in the earliest days of the colony. It has its services conducted in the French language and adheres today to the exact form of the old Calvinistic worship. For this church, in the first use of the style, White did little more than ornament a gable-ended building with Gothic buttresses, crestings, finials and pointed windows, but even with these he created, in the writers' opinion, a far more genuine religious atmosphere than that which surrounds many of the Christian adaptations of the pagan temples that were then ruling the ecclesiastical architecture of the city. Internally, being a small building, there were no piers, the Gothic work being confined to mouldings and to the plastered ceiling, which is in the shape of groined ribbed vaults springing from Gothic corbels on the side walls. Grace Church, Episcopal (1848), on a much larger, conventional scale, was the next church to appear in the Gothic style.

The Unitarian Church was the third to adopt the new mode. This denomination had come into being through secession from the Congregationalists, who, in turn, had been formed by those remaining in the "White Meeting House" Church after the withdrawal of the strict Presbyterians in 1734 to form a church of their own, modeled after the Church of Scotland. The Congregationalists prospered, in spite of the loss of the Presbyterians, and built a second church to accommodate their members in 1772—a gable-ended structure with circular-headed



Beth Elohim Synagogue, Charleston (1840)



French Huguenot Church, Charleston (1844)

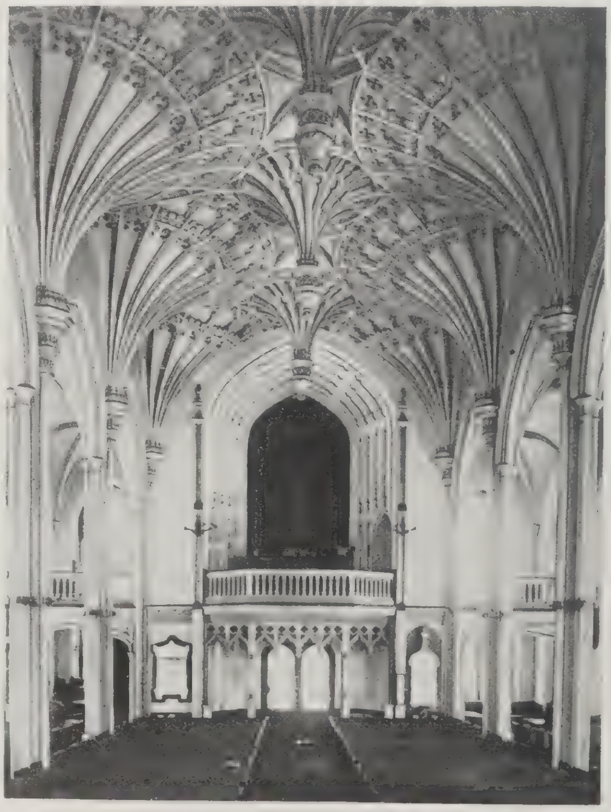
windows and a square tower in two stages. With the formation of the Unitarian body in 1817-19, this church was given to them as their share of the corporation assets and served them until 1852, when growth demanded a new building.

Jones and Lee were the architects for the new building—the former apparently unknown save for this mention, the latter a member of the church and architect for several other buildings. Portions of the side walls of the church of 1772 were incorporated into the new building by vote of the congregation for the sake of sentiment, although it was a costly proceeding, and only a few piers could be used. The illustrations give the best idea of the building without and within for comparison with other buildings of the time to determine in how significant a place this church should be ranked in the history of the Gothic revival. The *Charleston Courier* of April 5, 1854, says: "The style adopted is 'perpendicular'—the latest and richest of all the styles of Gothic architecture. . . . The most striking feature of the interior is the ceiling of the nave, being, it is believed, the only work of its kind in the country." Lee plainly derived his inspiration for the ceiling from the Chapel of King Henry VII in Westminster Abbey, but carried it out beautifully, both in design and workmanship.

What has gone before, in Charleston, has left an indelible imprint, and this scant record may be of use to those interested in architectural history alone. We hope, however, beyond the fact of showing one chapter in the history of American architecture that these studies may help in another way. There is the slowly developing tendency of the architects of today to return to historic precedents and tradition of earlier American architecture, adapting them, of necessity, to modern needs and thus expressing the best of the characteristics of the past that have been fused together to make us a nation. To know these characteristics in a human way is, therefore, essential, and of them none better can be found for study than those that exist in the areas from which they first spread—Massachusetts Bay, the valleys of the James, Delaware and Hudson rivers, and the tidewater country of Carolina.

### Authorities Consulted and Quoted—Parts 1, 2 and 3

Baptist Church, Charleston, History of
Brackett; History of Second Presbyterian Church, 1898.
Brown; Sketch of Unitarian Church, Charleston, 1882.
Commons Journal MS. and Council Journal MS.
College of Charleston, Trustees' Minutes, 1790-1880.
*Courier*, The Charleston, 1850 etc.
Dalcho; Church History of So. Car., 1820.
Fraser, Charles; Reminiscences of Charleston, 1854.
Fraser, Charles; Corner-stone Address, Col. of Charleston, 1828.
*Gazette*, The *So. Car.*, 1740 etc.
Gilman, S.; The Old and The New (Unitarian Church), 1854.
Holmes, G. S.; Historical Sketch of St. Michael's Church, 1887.
Hopkins; Historical Sketch of St. Mary's Church, 1897.
Horn; Historical Sketch of St. John's Lutheran Church, 1884.
Howe; History of Presbyterian Church in So. Car., 1870.
Huguenot Church, Sketch of, 1885.
McCrady, E.; South Carolina under Proprietary Government, 1897.
“ “ South Carolina under Royal Government, 1899.
“ “ Historical Sketch, St. Philip's Church, 1896.
“ “ Address, Medical Col. of S. C. Commencement, 1886.
Mesne Conveyance Office, Charleston, S. C.; Deeds and Records.
Missildine; Historic Sketch Congregational Church, 1882.
Presbyterian Centennial, 1914.
Ramsey; History of South Carolina, 1809.
Rivers; Historical Sketch of South Carolina, 1856.
Smith, A. R. H. & D. E. H.; Dwelling Houses of Charleston, 1917.
Synagogue Beth Elohim, 1883.
Smythe, A. T.; History of the Hibernian Society, 1901.
Wilson, C. C.; Robert Mills; Bull. of U. of S. C., No. 77, 1919.
Wragg, W. T.; Notes on St. Paul's Radcliffeboro, 1895.
Year Books, City of Charleston, 1880-1900.



Interior of Unitarian Church, Charleston (1852)

# Concreting in Freezing Weather

*By* E. F. ROCKWOOD, M.AM.S.C.E.

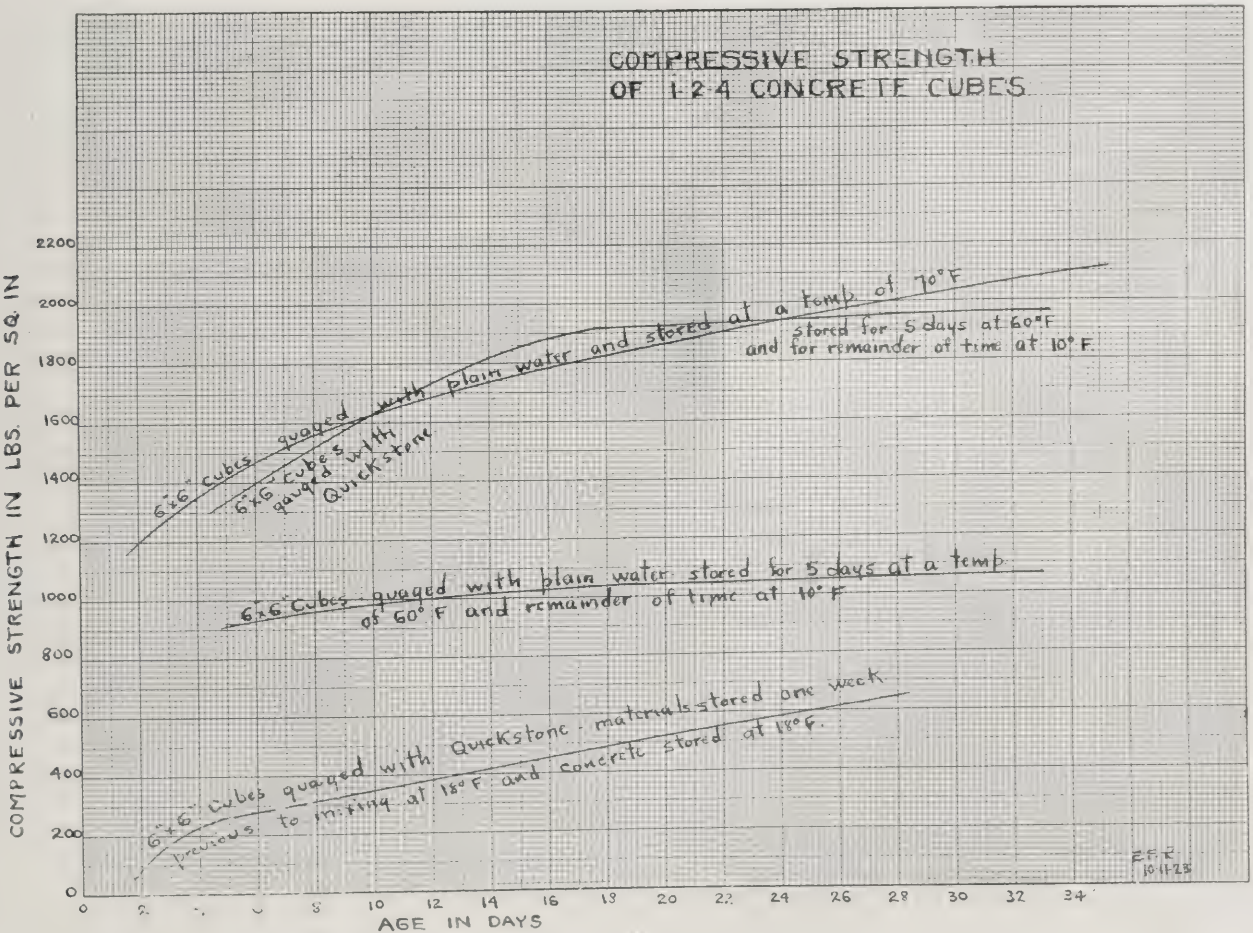
COLD weather slows up the setting and hardening of concrete and may even suspend entirely the activity of the cement. The chart given here shows the increase in strength of a 1:2:4 mortar stored under a temperature of 70° Fahr. From this we see that the average strength at 5 days is 1,400 pounds, at 19 days 1,840 pounds, and at 33 days 2,090 pounds per square inch. In other words, the gain in strength from the 5th to the 19th day is 440 pounds, and from the 19th to the 33d day 250 pounds.

The Henry S. Sparkman Engineering Company of Philadelphia made in 1918 a series of compression tests which show very plainly the effects of low temperatures. These were made on 6-inch cubes of 1:2:4 concrete. All specimens were allowed to harden for 5 days at a temperature of 60° and then were stored at a temperature of 10° until tested. The average strength after 5 days at a temperature of 60° was 917 pounds; after 14 days' storage at 10° it was 1,043 pounds or a gain of only 116 pounds as compared with 440 as shown in the chart. After 28 days' storage at 10° the strength was 1,063 pounds, a gain of only 21 from the 19th to the 33d day as compared with a gain of 250 pounds for concrete stored at 70°. In other words, the low temperature practically suspended the setting and hardening of the concrete.

This suspension of the activity of the cement is not injurious to the concrete, but it will increase the cost of concrete construction. With a temperature of 70° floor forms can be stripped in from 7 to 10 days, but as the temperatures grow lower and lower the forms must be left in place longer and longer. The writer knows of instances where they have even had to be left in place until warm weather came in the spring, and this delays the completion of the building and adds to the cost.

Cold weather has another effect on concrete which may be injurious, i.e., a low temperature may freeze the concrete, and this in turn may injure or destroy it, particularly if it happens after the initial and before the final set. After the final set it is not so serious, although even then alternate freezing and thawing will probably weaken the concrete.

The writer therefore recommends these rules: 1st. Never pour concrete when the temperature is below 40° unless the mix can be brought up to this



temperature and kept there for a period of at least 48 hours. 2d. Keep the concrete properly supported until it has attained sufficient strength to carry all loads that may be brought upon it.

The next step is to find methods of meeting these conditions. The first method involves applying heat and protecting the concrete so as to retain that heat until the final set has been reached. The second method requires either that forms be left in place until the temperature of the concrete rises sufficiently, or that some means be found to accelerate the hardening of the cement without waiting for warmer weather. There are two ways of complying with each requirement. The materials can be heated previously to mixing and the concrete itself can be heated after pouring, or an accelerator and anti-freeze substance can be added to the mix, or a combination of both methods can be used.

With either method the forms and reinforcement must be free from all ice and snow, and the sand, stone and water must contain no ice or frozen lumps. All these would consume heat that should go into setting and hardening the concrete. Then, any or all of the materials may be heated and the concrete properly protected by salt, hay and tarpaulins. In this way the concrete can easily be kept from freezing for the 48 hours recommended. This method, however, will simply prevent injury to the concrete from freezing and will not permit early removal of the forms. This latter can then be accomplished by enclosing the structure with tarpaulins and supplying artificial heat by means of steam pipes, stoves or salamanders. As an alternate, a specially prepared solution of calcium chloride can be mixed with the concrete. This will not only prevent freezing during the first 48 hours but will permit the concrete to gain in strength during the next two or three weeks at nearly the same rate as in warm weather.

We will refer once again to compression tests made on 6-inch cubes by the Henry S. Sparkman Engineering Company. The sand and stone were stored for one week at a temperature of 18°, then taken out and mixed with cement and water and immediately placed again in the cold storage room under a constant temperature of 18°. The cubes mixed with plain water, when removed to ordinary temperatures at 48 hours, 96 hours, 7 days and 28 days, were found to be frozen and upon thawing for a few hours became mushy, indicating that no setting or hardening had taken place. Those made from concrete gauged with a calcium chloride solution were not frozen, as immersion in warm water showed no sign of thawing. Their compressive strength at various periods after one hour immersion in warm water was, according to the records:

| | | |
|---|---|---|
| 48 hours | 92.3 | pounds per square inch. |
| 96 “ | 218.0 | “ “ “ “ |
| 7 days | 249.3 | “ “ “ “ |
| 28 “ | 643.0 | “ “ “ “ |

Stored 90 days at 18°, then 30 days in ordinary air temperatures (60-70°), 1,554 pounds per square inch for those gauged with the solution, 703 pounds per square inch for those gauged with plain water. Therefore, these tests show that such a solution will prevent freezing. Tests were also made similar to those mentioned earlier in this article, and they showed that while cubes gauged with plain water gained only 116 pounds per square inch from the 5th to the 19th day and 21 pounds from the 19th to the 33d day, those gauged with the calcium chloride solution increased from 1,327 pounds per square inch at 5 days (stored at 60° for 5 days) to 1,911 pounds per square inch at 19 days (5 days at 60°, 14 days at 10°) and to 1,958 pounds per square inch at 33 days (5 days at 60°, 28 at 10°).

Therefore, while either heating the materials or using a calcium chloride solution will prevent the freezing of the concrete, heating the materials alone will not permit the concrete to continue to gain in strength after the first 48 hours, although this solution alone will. On the other hand, there are limits to the effects of even such a solution, and a combination of both methods may be best. The writer therefore recommends this procedure: For temperatures above 28° use a special calcium chloride solution. If this is not available, heat either the sand, stone or mixing water. For temperatures of from 22° to 28° heat any one of the materials and also use the solution. From 16° to 22° heat all the materials and use the solution. If the temperature is below 16° it is probably uneconomical to attempt to pour concrete at all.

In using a calcium chloride solution the commercial grade calcium chloride will not meet requirements, but a special solution made for the purpose must be used and the recommendations of its manufacturer followed. If a calcium chloride solution is used it will not be necessary, from a standpoint of safety, to enclose and heat the building. However, such protection is probably well worth its cost when the average temperature is below 25°, because it will permit the forms to be stripped sooner and therefore fewer forms will be required. All tests show that the solution mentioned will not injure the concrete or corrode the reinforcement. Salt has been used to lower the freezing point of the concrete, but its use is bad practice and should be avoided, as it weakens the concrete.

If the suggestions given in this article are followed, concrete may be poured safely in cold weather at slight increase over cost in warm weather.

# Plate Description

House of Maurice Brill, Esq., 163 East 63d Street, New York. Plates 10-13.—With the growth of apartment house building in New York each year sees the erection of a smaller number of individual residences. The few built, however, are likely to be of size and character which render them particularly interesting. Mr. Brill's residence, of which Frederick Sterner is architect, is quite representative of the modern type of individual New York house. The exterior presents a distinguished facade, even in a block which contains many which are far removed from the ordinary. Brick and stucco are the materials used, and the Tudor character is heightened by the use of steel casements with small diamond-shaped panes and many inserts of stained and painted glass.

The Tudor architecture which characterizes the exterior is perhaps even stronger within, for a number of the principal rooms are walled with old oak paneling of the period, the ceilings being of simple timber and plaster design and the floors of dark red paving tile. The furniture consists to a great extent of antiques, selected and arranged with the taste for which Mr. Sterner is well known. The unusual width of the building has made possible its disposition on the plot in such a way that a considerable part of the property behind the house is available for use as a garden. The facade of the house which faces the garden has been carefully designed, and the garden itself is walled in with brick and laid out with flagged paths, hedges and shrubbery, and adorned with several figures of lead.

House of Edward Lowe, Esq., Montecito, Cal. Plates 14-16.—A study of the contemporary domestic architecture of southern California would lead one to believe that by far the greater proportion of dwellings are being built after the manner of the early Spanish Renaissance,—the simple and slightly austere type of which the buildings erected by the early Franciscans are such excellent examples. Like every form of architecture first used during the settlement of a region, this type is well adapted to its use. A climate always temperate and often warm calls for buildings having walls of rather more than average thickness, while sunny, cloudless days make grateful the shade offered by loggias and in rooms where comparatively little space is devoted to windows and where there are broad expanses of wall.

An instance of the successful use of this architectural type is found in this house at Montecito. The architects, Johnson, Kaufmann & Coate, have designed many California residences in this style, and here as in many other instances are seen their skillful, clean-cut structural lines, the judicious placing of windows, well considered sloping of tile covered roofs and the admirable use of simple wrought iron in balcony rails and of perforations or "reticulating" in the walls at certain places where ordinary window openings were not necessary.

The house is built of hollow tile which has been coated with stucco, the stucco having been slightly colored in mixing to afford a pleasing combination with the tile used upon the low pitched roofs.

Detail of Arcade on South Front
Hart House, University of Toronto, Toronto
Sproatt & Rolph, Architects

# EDITORIAL COMMENT

## ARCHITECTS PROMOTE BUILDING STANDARDS IN OHIO

PRESENT economic conditions have perhaps exerted a greater influence on building construction than in any other field of business activity. Other businesses, too, are generally better able to adapt themselves quickly to changed conditions, but the building industry is still largely a handicraft, and its methods do not differ greatly today from those of a hundred years ago. Legislative enactments have for many years standardized certain types of construction and classes of buildings. This process is necessarily slow to recognize changed conditions, and when intelligently directed promotes conservatism that is in the long run good for safe building; in times such as the present, when economic necessity urges use of improved methods and new materials, it acts as a handicap, particularly since the subject is of a highly technical character and rests for decision with non-technical bodies.

The remedy for existing conditions must originate in the professional bodies allied with the building industry; constructive suggestions can be supplied only by those with a disinterested technical background that permits intelligent discrimination between business expediency and principles.

An example of such progress is the organization of the Ohio Board of Building Standards, which became effective October 23, 1923. The functioning of this board is designed to place legislative restrictions and standards for building on a reasonable, common sense basis that will accord with modern economic conditions and recognize modern technical skill in the production and use of building materials and architectural and engineering skill in the design of structures. The bill which created the board was prepared by and enacted through the efforts of the Ohio State Association of Architects, and broadly speaking it provides: for the revision of the Ohio State Building Code and other state laws regulating buildings and the sanitation and equipment thereof; for making uniform existing lawful requirements imposed by various departments under the police power of the state; for the writing of legislation to regulate the construction of buildings not regulated by the state code or by lawful requirements; for the supervisory centralization of building regulation in one state activity; for the making of building regulation reasonable in its imposed requirements; and, particularly, for creating lawful machinery through which building regulation may be kept abreast of building progress and practice without recourse to legislative action.

The Board of Building Standards law is not a detailed building code. It defines the principles of and is a basic building code. It provides for the prompt determination of present and future code requirements by the board itself. Its defined purpose is that all public buildings used or that may be used for resort, assembly, education, entertainment, lodging, trade, manufacture or repair, storage, traffic or occupancy by the public, and all other buildings, except single and two-family dwellings, within the corporate limits of a municipality or on allotted territory within three miles thereof "shall be so constructed, erected, equipped and maintained that they shall be safe and sanitary, for their occupancy."

The Ohio State Building Code has not been changed or amended in any essential particular since it became a law, 12 years ago. Efforts to amend it and to enact a complete up-to-date code have met the usual fate of technical legislation submitted to non-technical deliberative bodies. The Ohio Supreme Court recently held that the division administering the code has no power to determine equivalents for nor to modify or change any of its requirements, regardless of how archaic they may be, a power supposedly conferred by the law under certain protective provisions. The somewhat uncoördinated administrative provisions have tended toward confusion and inconvenience on the part of those engaged in the construction of buildings. The new board has every prospect of eliminating these conditions, which have acted as a restraint to building construction, because of the power invested in it to determine equivalents for existing and future requirements without resort to legislative deliberation.

The board has a membership of seven, two of whom are state officials and five members by appointment of the Governor. The members and officials are: Herbert B. Briggs, architect, Cleveland, chairman; Thomas P. Kearns, the Chief of the Division of Workshops, Factories and Public Buildings of the State Department of Industrial Relations, secretary; William H. Dittoe, Chief Sanitary Engineer of the State Department of Health; Peter E. Dempsey, attorney-at-law, Columbus; John H. Clemmer, general contractor, Akron; Edward J. Cavan, electrical engineer, Cleveland; William C. Groeniger, sanitary engineer, Columbus. The board is established in the Department of Industrial Relations. It is authorized and instructed to "formulate and report to the General Assembly" amendments to existing building construction and equipment laws and additional legislation "to carry out fully" the purposes of the act creating it, including the coördination of all regulatory functions of the state, and, on petition of any party at interest, to determine and establish equivalents for required, or to be required, fixtures, devices, materials, systems or manners of construction or installation, or to refuse to grant such petition. It is directed to recommend and promote statewide uniformity in building law and ordinance regulation requirements.

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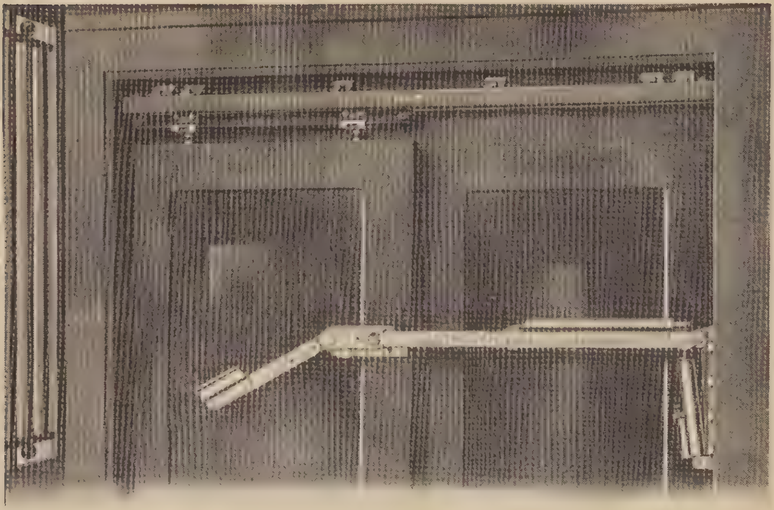

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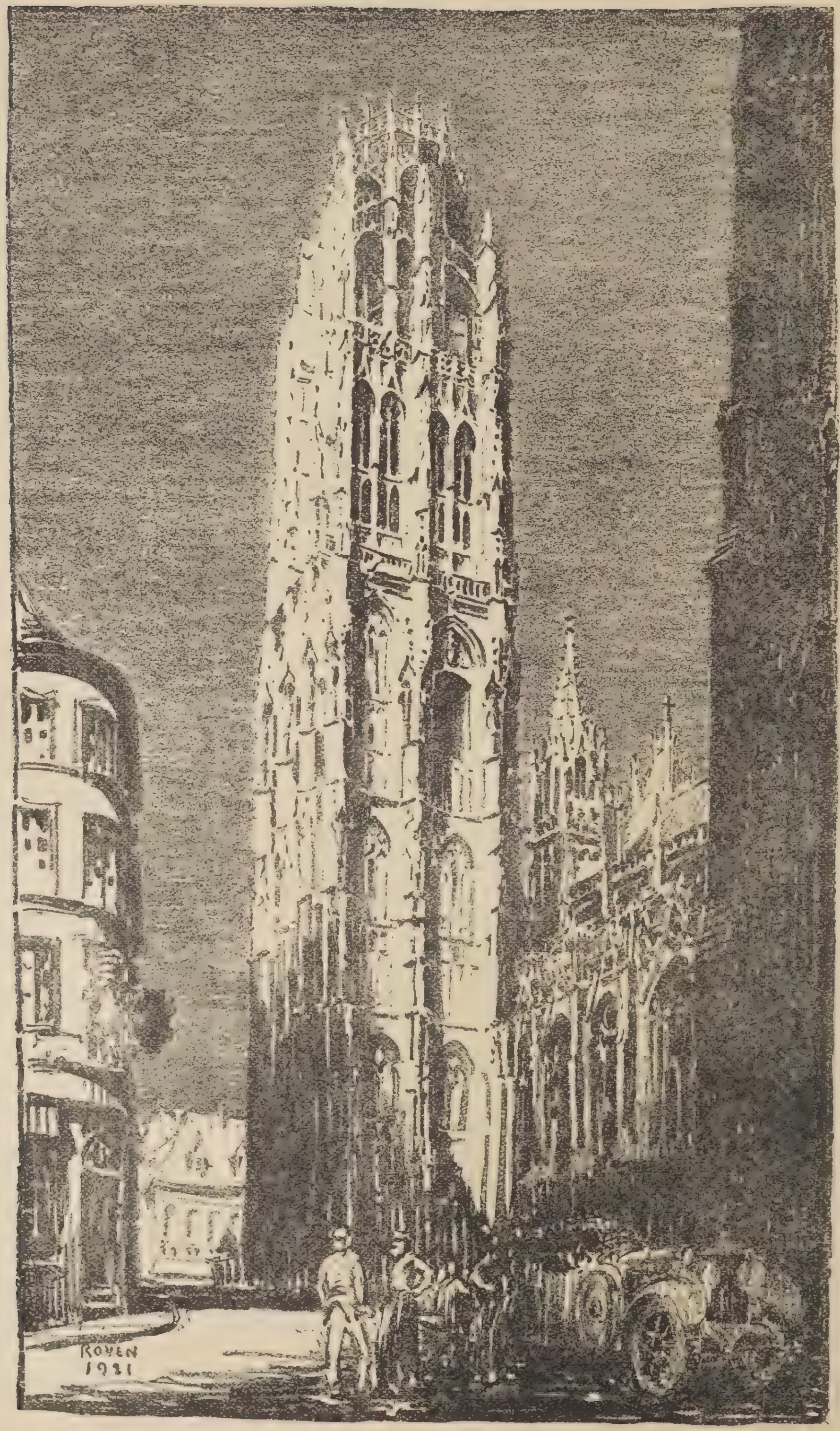

TOWER, ROUEN CATHEDRAL

FROM LITHOGRAPH BY J. R. ROWE

The
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# The Greek Revival

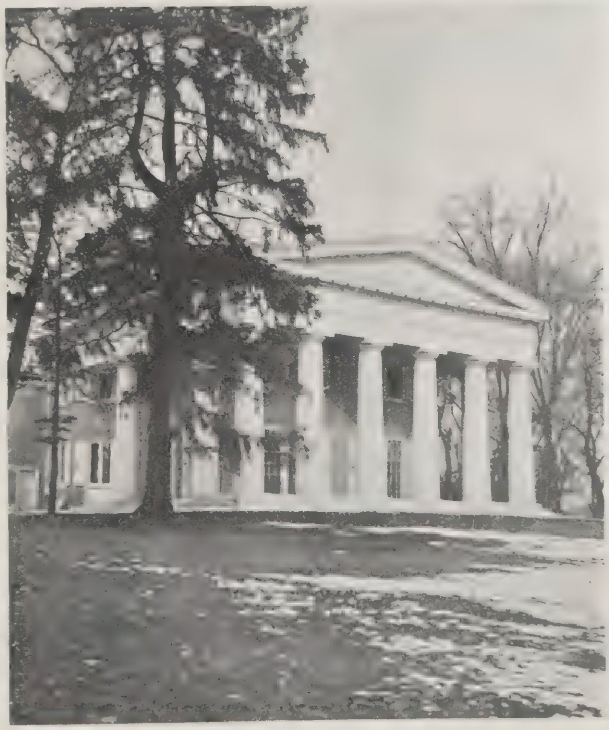
## I. THE AMERICAN NATIONAL EXPRESSION

*By* HOWARD MAJOR

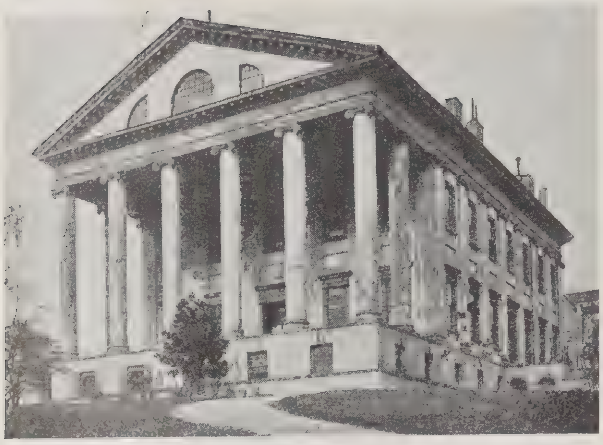
PREVALENT opinion decrees that Colonial architecture is America's individual contribution to the arts. This is, however, far from the truth; the much ridiculed Greek temple home of the first part of the nineteenth century is our independent gift to universal architectural development.

Counterparts of Colonial architecture are found throughout England, and the inquisitive may readily verify this statement by a comparison of smaller English domestic work of the eighteenth century with contemporaneous American work. This similarity was first called to our attention in "The Georgian Period" (1901). It is now universally conceded by authorities in both countries, as by S. C. Ramsey in "Small Houses of the Georgian Period" (London, 1919) and Fiske Kimball in "Domestic Architecture of the American Colonies" (New York, 1922), among recent works.

Having been born and bred with this idea of Colonial architecture's being our national style, we may well consider the statement to the contrary as startling. The great mass of Colonial data gathered and published verifies our first belief, particularly as until recently practically no data of similar nature was gathered in England. True, much eighteenth century architectural data has been published in England, but it has invariably related to the large and elaborate buildings. Nothing on such a grand scale was attempted here as in our mother country. Therefore the only comparison possible until recently has been these great English manor houses with our modest domiciles. Naturally enough we jumped to the conclusion of dissimilarity. Within the last few years there has come to light much English resemblance that is indeed startling. One might wonder, with the two countries in those days so widely separated, how such a similarity could exist. However, the reason is simple enough. In outlying districts in England and throughout America the designing of the home was entrusted to either a gentleman amateur or a builder. Both designed with the aid of English handbooks on architecture, of which a great number were published and sold at reasonable prices. These books quickly found their way to America, and every carpenter provided himself with several of the latest editions. The popularity of these books may be judged by the great number of editions published, sometimes running to as many as 10 or 12. Therefore, whether in England, Virginia or New York, amateurs copying the same motif would naturally produce strikingly similar results.

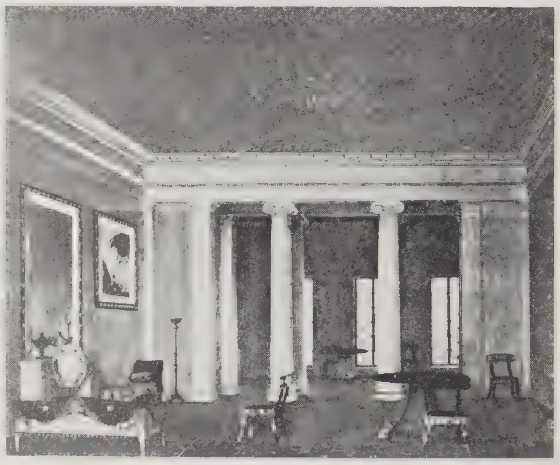

Nicholas Biddle House, Andalusia, Pennsylvania
The first example of the colonnade encircling the building

This is not true of the Greek revival temple home. It is America's individual expression,—our own great national style in architecture. There are no counterparts of the temple used for dwelling purposes in Europe. Much has been written derogatory to

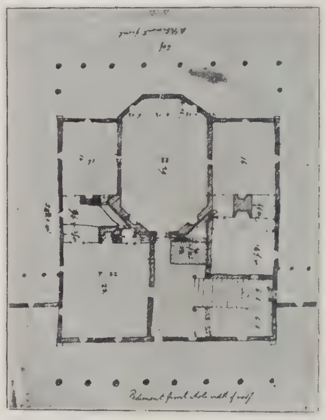


Virginia Capitol Building, Richmond, Virginia, 1789
The first actual instance of the temple form used for other than purposes of worship

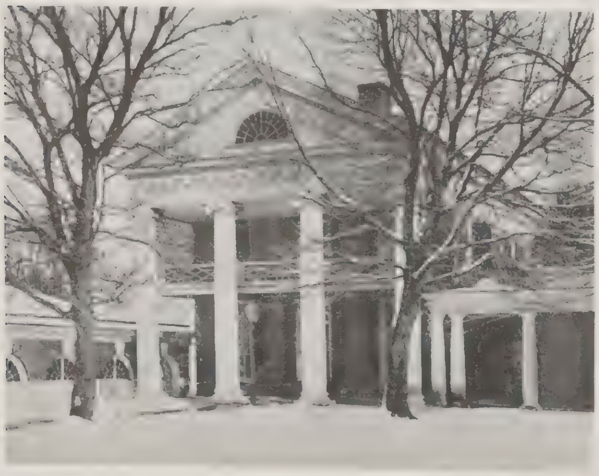
this style, but much can and undoubtedly will be written in its praise. In America it is unsurpassed for its restraint and stateliness. Charm, the most elusive factor in architecture, has been attained, particularly in the type of temple with two low subordinated wings at right angles to the main axis. Such is the Mackay house, Willseyville, N. Y. Fiske Kimball thus pays his tribute, ably summing up this Greek revival period: "American domestic architecture made its independent contribution to universal development. Whatever may be thought, there can be no doubt that it endowed America with an architectural tradition unsurpassed in the qualities, monumentality and dignity." Such was the style.



Interior of a New York House of the Greek Revival Period
From original drawing of the New York Historical Society



Sketch Plan for Remodeling the Governor's House at Williamsburg, Virginia, 1779, by Thomas Jefferson
This is the first suggestion of a pediment roofing the entire building, thus forming a temple



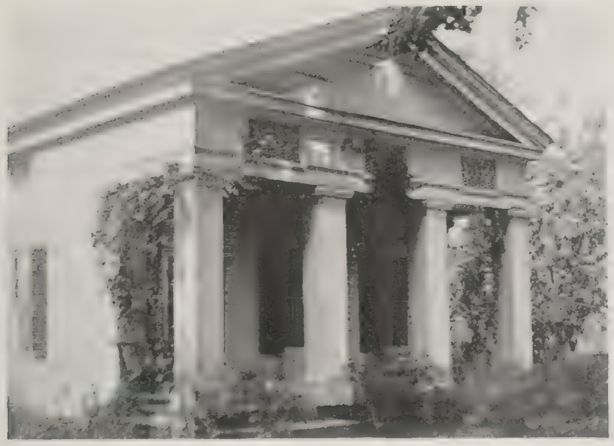
Professor's House, University of Virginia, 1818
The first example of the temple used for domestic purposes

## Growth of the Style

After the revolution America naturally turned more to the continent for inspiration than theretofore. The nation, now a republic, regarded with favor the ancient democracies of Rome and Greece and not the monarchies of western Europe. At this time abroad much research was devoted to the classic models of antiquity, and America eagerly assimilated the results to a greater extent than the older nations of Europe. With the monarchy overthrown in France, a stronger tendency than in England now prevailed for restrained classic design, and at this time "Vive la France" was indeed strong in America. The stage was set for our classic revival.

It is true that the classic revival had its beginning abroad, with its ultimate ideal the temple, but its realization was in America. Here was developed its great scope from the largest public buildings to the humble domicile, with an independent initiative seen nowhere in Europe. Its first expression is seen in the Virginia Capitol (1789) which preceded the Madeleine in Paris, the first great European temple reproduction, by 22 years. In 1819-1826 the Bank of the United States was built in Philadelphia, antedating the corresponding foreign interpretation of the Parthenon, the National Monument at Edinburgh, by 10 years. For the first time America was in advance of Europe in architectural thought, and consequently in practice.

Books again were the direct factor, but of character widely different from before. The eighteenth century publications contained plates of houses, windows, doors, etc. which were actually reproduced; the later publications were restorations of classical antiquity which the designer adapted to his problems. Eventually, publications of the adapted solutions were published by Americans, but I am not familiar with any English publication of this character. By 1770 copies of the first volumes



Dwelling at Ann Arbor, Michigan
Although the style was not flexible, the designers had no difficulty in adapting it to the humblest dwelling as well as to the magnificent mansion. Note, to save expense, the use of the antæ in lieu of the more expensive columns

of Stuart & Revett's work "Antiquities of Athens," Thomas Major's "Ruins of Pæstum," and John Wood's "Palmyra and Baalbec" arrived in America, to be followed by other publications of similar character, and within a few years after the revolution these new forces were felt everywhere in various ways.

### Thomas Jefferson in the Eighteenth Century

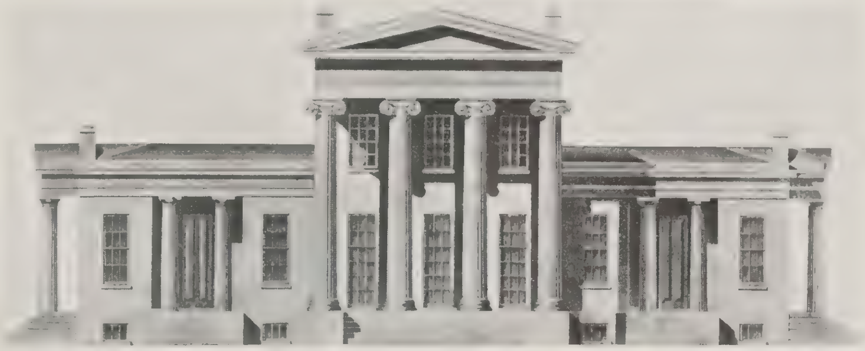
Just as Inigo Jones was the father of the Renaissance in England, so was Thomas Jefferson the father of the classic revival in America. Furthermore, Inigo Jones was the first great English architect, and so Thomas Jefferson, although a great statesman and diplomat, was the first great American architect. History further repeats itself for, as after Jones, individuals became determining factors in the characteristics of English architecture, so after the initiative of Jefferson, individuals played similar roles here.

Under Jefferson's leadership the South was first to feel the direct classicism of the revivalist in the temple form of architecture. The first forms derived from Roman antiquity were to be superseded by Greek forms, which were to prevail everywhere. So universally was Greek detail adopted after its introduction during the last year of the eighteenth century that although properly a classic revival, the period was to be known as the Greek revival.

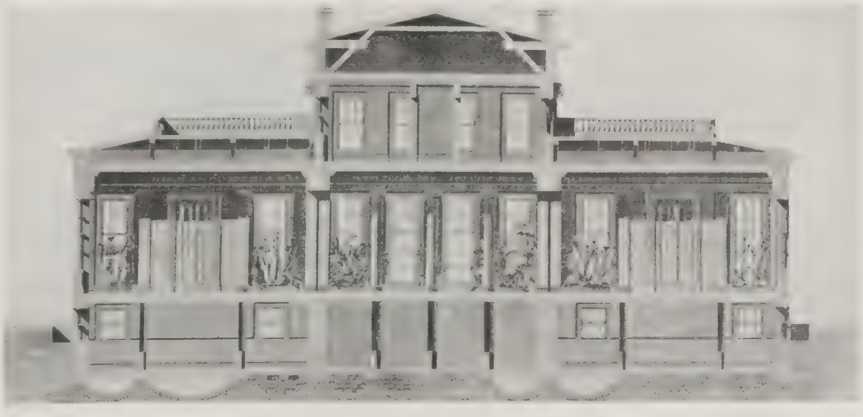
Jefferson, then Governor of Virginia, in about 1779 made sketches for the remodeling of the Governor's house at Williamsburg. In this he planned rows of eight columns at front and rear, with a pediment roof running from colonnade to colonnade, thus developing an amphiprostyle octastyle temple dwelling. This is the first instance of a temple form of architecture being adapted to domestic use. Nobody in Europe had conceived so radical a departure as this temple form. Applied to merely domestic purposes, Jefferson was ahead of the times, and the scheme was dropped for many years before it was again advanced. It is interesting to note that Jefferson designed this remodeling before his European trip, when he had opportunity of studying the antique at first hand and which confirmed his idea of the desirability of using this temple motif in architecture.

In 1775 Jefferson designed the Virginia Capitol building at Richmond, and it was completed in 1789. He had greatly admired the Maison Carree and modeled the Capitol after this temple with a row of six columns in front. This was the first example of the temple form actually erected in America and created a precedent for those already imbued with classical enthusiasm. In 1799-1801 Latrobe designed and built the Bank of Pennsylvania, with the Greek Ionic order of the temple form.

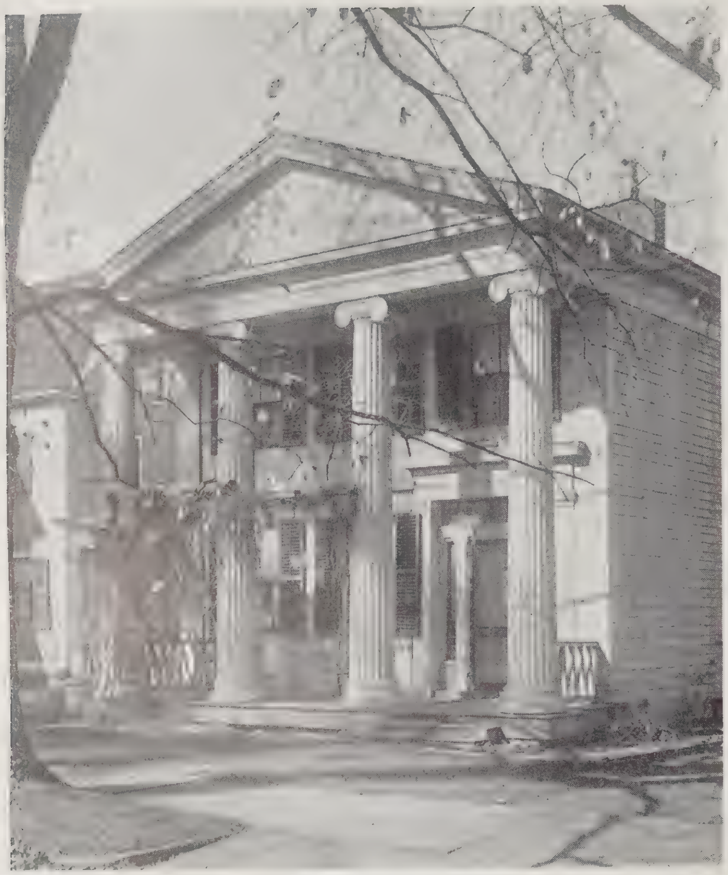
Jefferson was again to take the initiative in adapting the temple form for domestic purposes. This



Design from "The Modern Builder's Guide," by Minard Lafever, 1833
Compare this with the Mackay house, and it will be understood how the carpenter-builders in the 1830's could produce such interesting houses



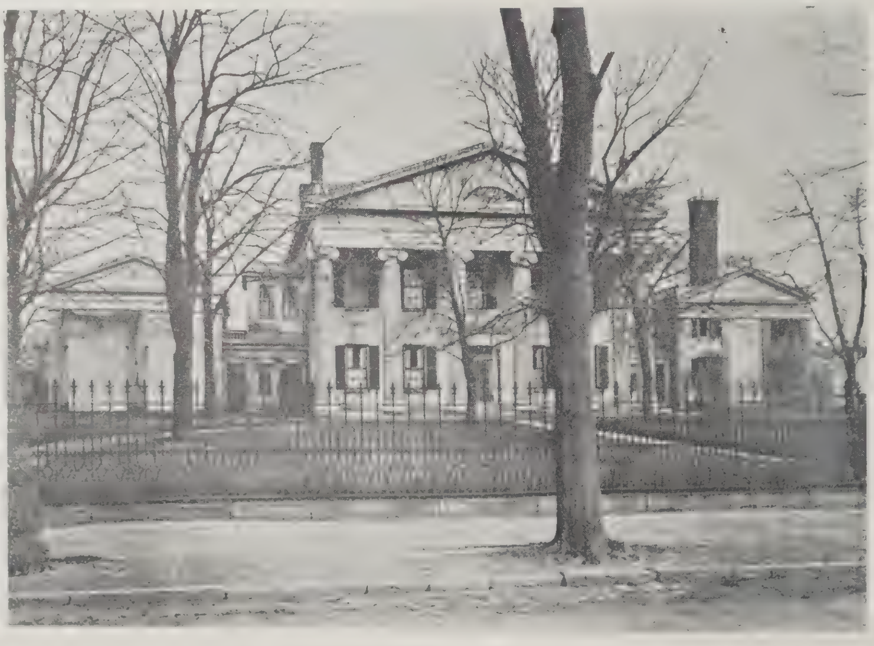
Section of the House Illustrated Above
Note the dignity and excellent composition of the interiors



House at Oswego, New York
The simplest and most common expression of the style

temple form in its entirety was adopted in Pavilion II (1818), a professor's house of the University of Virginia. While this professor's home contained a classroom, it was primarily for the use of the family. With this beginning it was not long before new examples began to appear elsewhere. George Hadfield designed and carried out "Arlington" (1826) with six great Greek Doric columns after the temple of Pæstum. Nicholas Biddle in remodeling his country house at Andalusia (in 1835) took the extreme step by encircling his dwelling with a colonnade forming a peristyle temple instead of the more frequent prostyle arrangement. Biddle was the first American to travel to Greece, where he became much interested in Greek art, so it is not surprising that he should be the first to make this radical interpretation. All that was now necessary was a house built like the Parthenon itself, and this was realized in 1835 at "Berry Hill," Virginia, with eight columns in front instead of six used for the portico.

Throughout the years 1821-1827 the war of Greek independence added fresh impetus to the classical movement. America was strongly in sympathy with the Greek cause and now evolved a desire for things Greek in every phase of life. Many of the towns of America received Greek names, as Athens in New York and Georgia, Sparta and Corinth in New York and Ypsilanti, Ionia and Scio in Michigan. Myriads of temple houses sprang up all over the country, in the North, South, East and West. The orders and details were carefully reproduced from imported publications on Greek restorations and from American handbooks such as Minard Lafever's "The Modern Builder's Guide," published in 1833. This now rare publication presented designs of the Greek temple house as well as details for doors, windows, etc. A quotation from Lafever expresses the independence of the American craftsman toward British design. From Mr. Nicholson, whom he mentions, he only utilizes his treatises on geometry and construction. To quote, "From the works of Mr. Nicholson of London I have received a greater amount of aid than from any other source. The only other authors to whom I owe acknowledgment are Messrs. Stuart & Revett, of London, from whose highly valuable and popular work, entitled 'The Antiquities of Athens,' I have borrowed the article

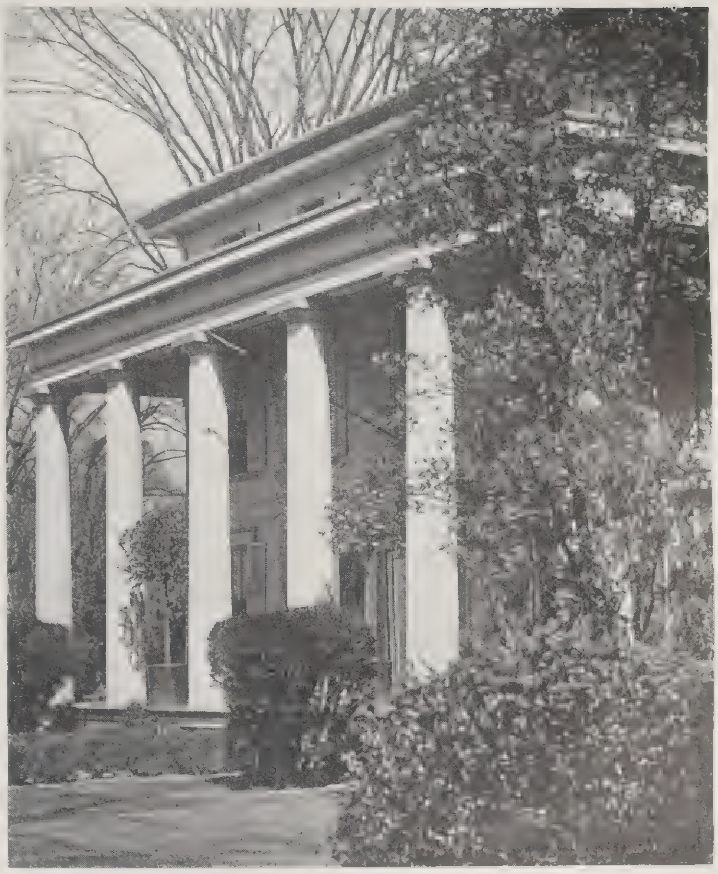


House at New Bedford, Massachusetts
The great monumental mansion of the 30's. In this case not only transverse wings but flanking porticoes have been added, adapting the Greek temple to the popular mansion plan of the preceding century

relating to the Ancient Orders of Architecture." He depended little on others.

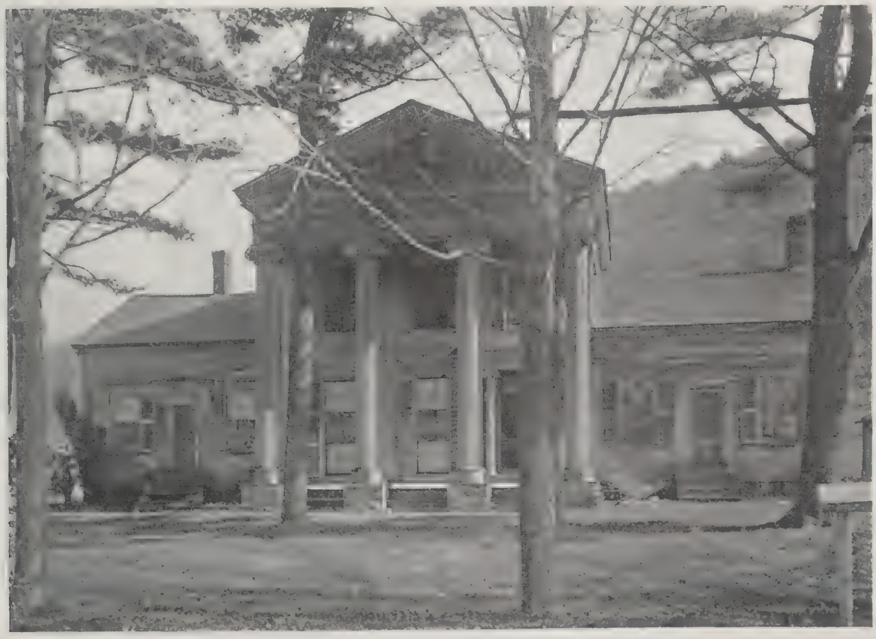
In outlying districts carpenters and builders had no difficulty in reproducing with exactness miniature Greek temples to house their clients. Certainly the chaste, dignified results of the first half of the nineteenth century may be favorably compared with much that preceded and with everything in the turmoil that followed.

Although the temple type was the most prevalent form and that which gave America its individual expression, other modifications had wide practice. The colonnaded front without the pediment was in common usage, although not as successful as that with the pediment. Another variation was that of the one-story wings flanking the two-story colonnade with pediment. This was the most successful expression, both from the point of view of the exterior and interior design and greater flexibility in planning for the requirements of the family. Indeed this type had many variations, and many of the examples have decided charm. It is a tradition of which we architects of today may readily make use. The simplest expression of the style is a long, narrow building with its end pediment fronting the street and without porticoes to carry the pediment. This is in direct contrast to the Colonial buildings with their long elevations toward the street. Substitutes for columns were square posts or *antæ,* which were less expensive and easier to build, and were generally effective.

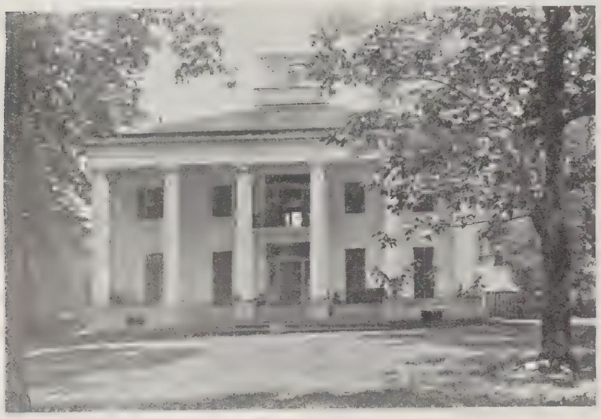


The Thaddeus Burr House, Fairfield, Connecticut, 1790
One of the first, if not the first, appearances of the Greek order

The windows of high, narrow proportions were carefully and in all instances successfully spaced upon the facades. Frequently the windows of the first floor ran to the ground, remaining double-hung, although sometimes casements were substituted. Occasionally triple windows with narrow side lights and square heads were employed. These were introduced in about 1790. When the facade was without the massive orders, a one-story portico of four columns with or without pediment, was most frequently adopted. When the pediment was not used a parapet or coping was employed with a fret or other Greek ornamentation. Recessed doorways with two columns between pilasters or *antæ* with an unbroken cornice gave dignity and importance to another type of entrance. The doorway itself was often composed of side-lights, either with or without straight transoms, with an



The Mackay House, Willseyville, New York
The most interesting phase of the style, the transverse wings allowing great scope in both composition and planning



"Devereaux," Natchez, Mississippi, 1830
The typical southern expression. Note the absence of the pediment

unbroken cornice over them. Engaged columns were as often employed as not between the door and the sidelights. Occasionally a curved transom surmounting sidelights and doorway was borrowed from the preceding period, but with Greek detail and of very different character than was used formerly. The typical pedimented doorways of Colonial days have now entirely disappeared.

The orders of the Colonial period were generally attenuated one or two diameters. Jefferson, however, abstained from this practice and adhered closely to Palladian proportions. When the Greek orders were introduced, the proportions illustrated by Stuart & Revett and similar authors were faithfully imitated. However, it was not uncommon at a somewhat later date to find the orders attenuated. Up to 1817 the Greek Doric was the popular order employed, to be followed by the ascendency of the Ionic. This in turn about 1833 was superseded by the Corinthian of the Lysicrates type. An unfailing characteristic was the full entablature completely encircling the building.

The interiors were bold and dignified. They were decidedly architectural, composed of straight, severe lines and with a tendency toward heavy detail. The walls were severely plain, plastered surfaces, without a dado or other interruption. The outstanding feature was the separation of rooms by means of *antæ* and columns with invariably the full entablature running around the room. The rooms were high-studded, with a pleasant though severe distribution of openings and chimneypieces. The doorways were wide and together with the *antæ* and columns created division between rooms; the first floor was opened up at the expense of privacy and intimacy. These rooms lent themselves to large gatherings rather than to intimate tete-a-tete. Wainscoting of every character had disappeared, in lieu of which the attention was devoted to delightful doorway and window trim. The chimneypieces were most frequently of black marble with wide, flat pilasters or columns and without overmantels. The characteristic trim had corner blocks with deep-cut rosettes. The moulded trim was of heavy, full contour, symmetrical on a central axis. Frequently a long middle block takes the place of the key, and this block is often carved in deep relief. Strangely enough, this trim is far from Greek in derivation, but harmonizes perfectly in its setting and is one of the entirely original expressions of the period. In fact it outlived the Greek revival and obtained well throughout the entire century, I am afraid, to its detriment and unpopularity, which is hardly deserved when the early examples are seen.

By 1850 the Greek revival had drawn to a close, and the "wooden Gothic" and "early Pullman" came into their own, creating a second "Moyen Age." One may well remember how much the Greek revival has to do with the new classic revival of the present, which began in the 90's. Certainly there are today many strivings like to those of a hundred years ago.

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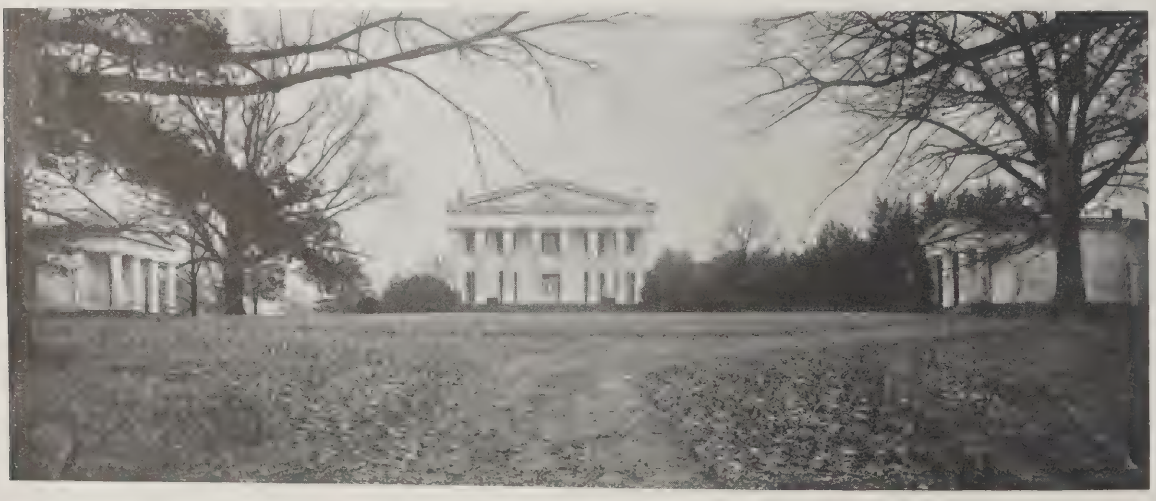
NOTE.—Mr. Major is preparing a work upon the Greek revival, particularly its domestic phases, and would be glad to receive photographs of such examples as his fellow architects have. He would also be grateful to know of examples of work of this character. Mr. Major's address is 154 East 61st Street, New York.—THE EDITOR.



"Berry Hill," Virginia
The final realization; eight columns instead of six; the Parthenon transplanted to America

# The Palazzo Linotte, Rome

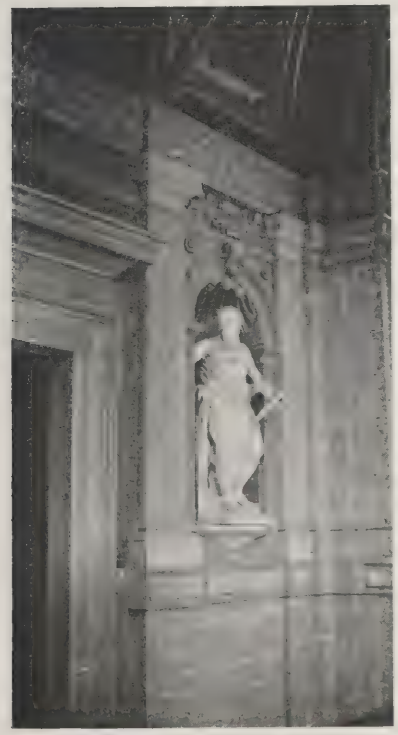
*By* LLOYD MELVILLE HENDRICK, JR.

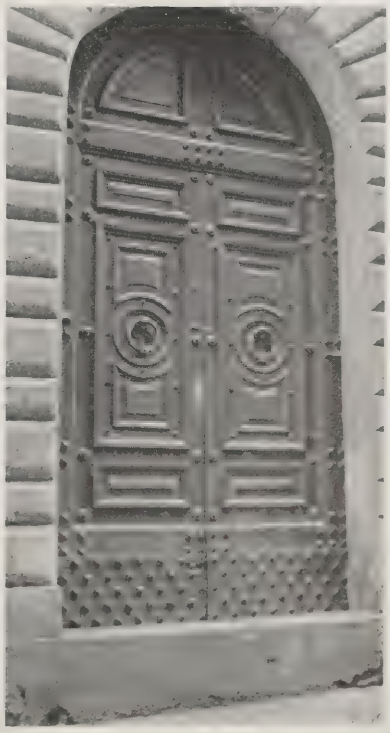
ORIGINALLY a private dwelling, like its neighbor the Massimi, the Palazzo Linotte was erected about 1523 to accommodate Thomas Le Roy, a French prelate called to Rome and undoubtedly attached to the papal staff in the nearby Cancelleria. Le Roy's origin and family are pleasantly recalled in the frequent use on the building of the fleur-de-lys combined with his armorial lilies. The authorship is much in doubt, lying between Peruzzi and San Gallo the younger, with most authorities favoring the latter.

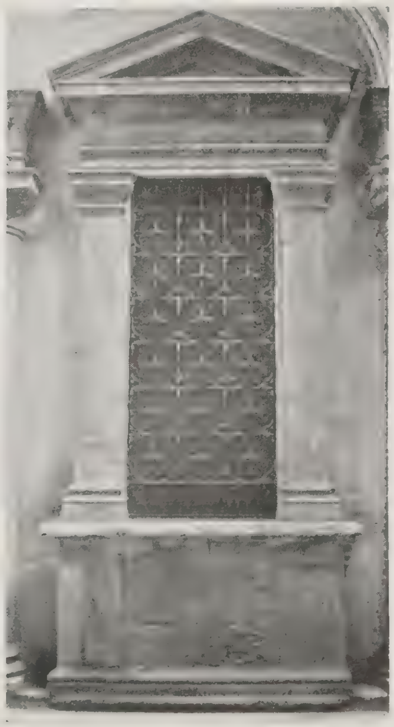
The front which is called the principal facade in the accompanying drawings was originally the entrance front, and most certainly faced an open space instead of the present narrow alley. From the entrance a barrel vaulted vestibule leads into a courtyard. The building surrounds this in a U-shaped manner, the open side enclosed by a one-story wall pierced by an archway opening upon a modern terrace reminiscent of a former garden development. The side which faces upon the Corso Vittorio Emanuele and contains the present entrance is wholly modern.

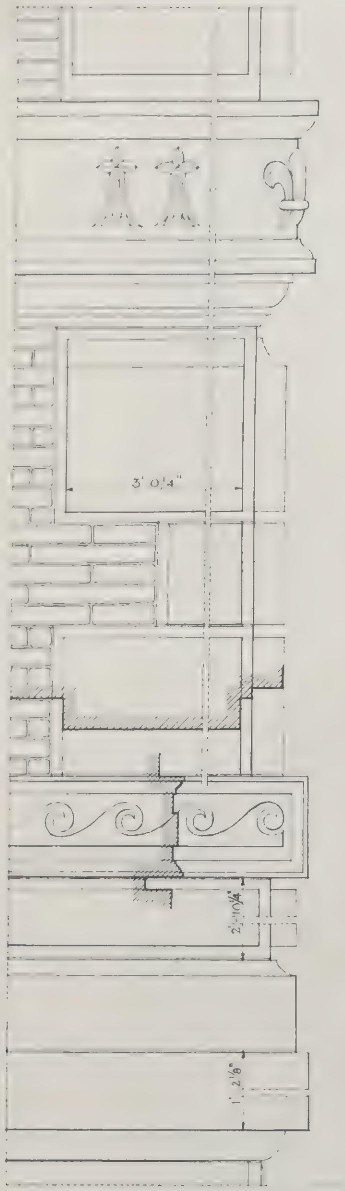
Old photographs and drawings show here a miscellaneous collection of structures of the poorest kind built against and into the Linotte to the depth of the present loggia. In the restoration, completed in 1898, these excrescences were torn down, and construction made of the existing facade which takes up the lines and carries out admirably the character of the old portions of the building. The corner loggia in three stories is an element of doubt if we try to find for it any historical basis as being part of the original scheme. Yet beyond its use at the ground story as the present entrance it serves no requirement of the municipal art commission which has occupied the building since its restoration. On this account, and knowing the solicitude elsewhere for faithful reproduction of the older parts, it may be reasonably concluded that the restorers had access to information not available now, and found therein authority for the loggias.

The chain of historical accuracy, on which too much emphasis is often put, may be laid aside in the agreeable appreciation of the building as it stands. Up to the second story windows the material is travertine; above, the field of the walls is brick to match, with travertine trimmings. The sashes are leaded and glazed in different patterns with small panes that vary from translucent white to faint orange and purple. None can deny that this and similar details frequently passed by as trivial contribute vastly to the satisfaction of the beholder. The walls and ceilings of the loggias on the street side above the first story are finished in travertine, cippolino, serpentine and marbles of white and gray that combine pleasantly with plaster surfaces colored flat in some cases and elsewhere decorated more elaborately. If it be a dangerous business to speak of this modern work in the same breath with

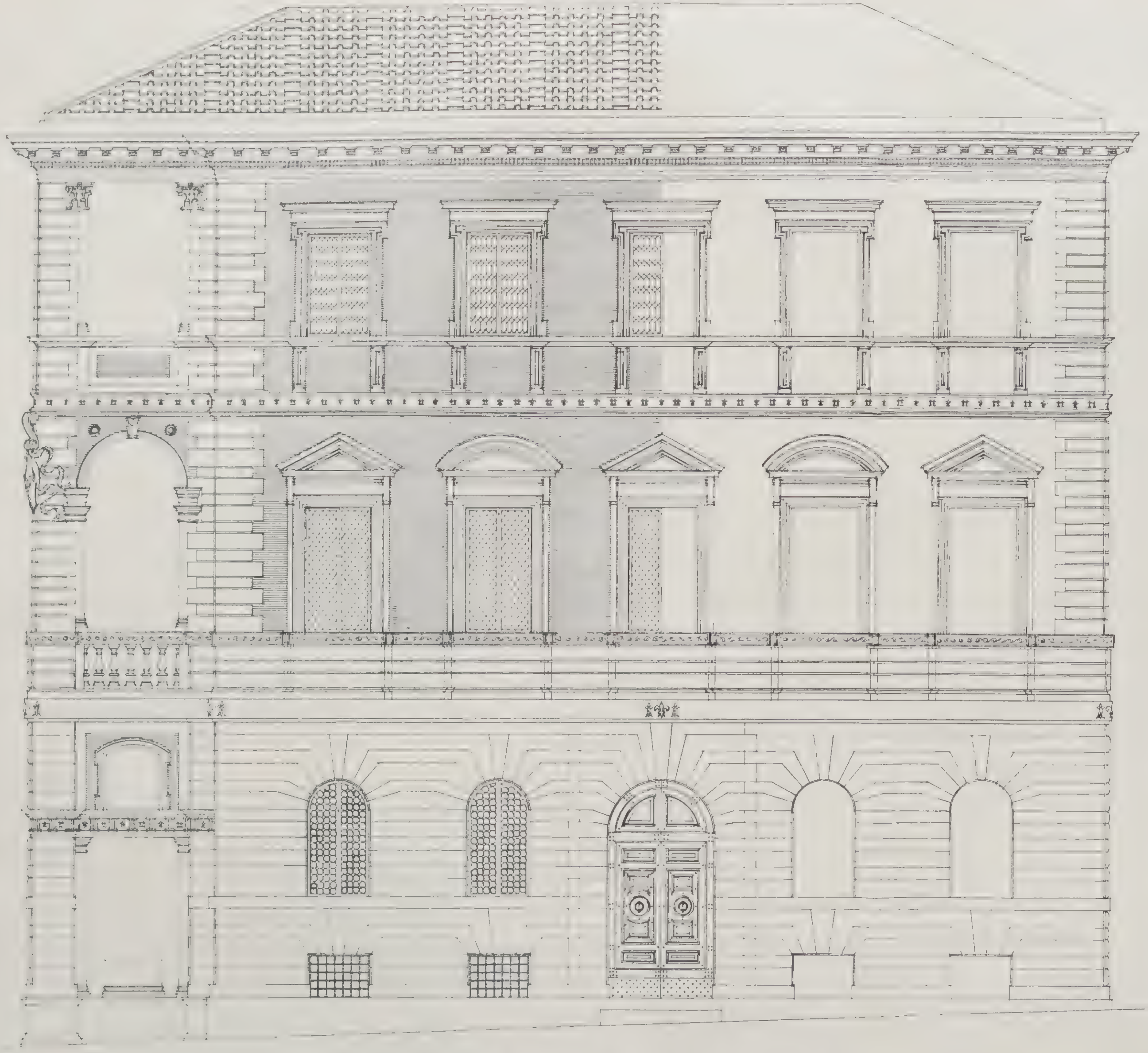

Vestibule, Principal Facade


Entrance, Principal Facade

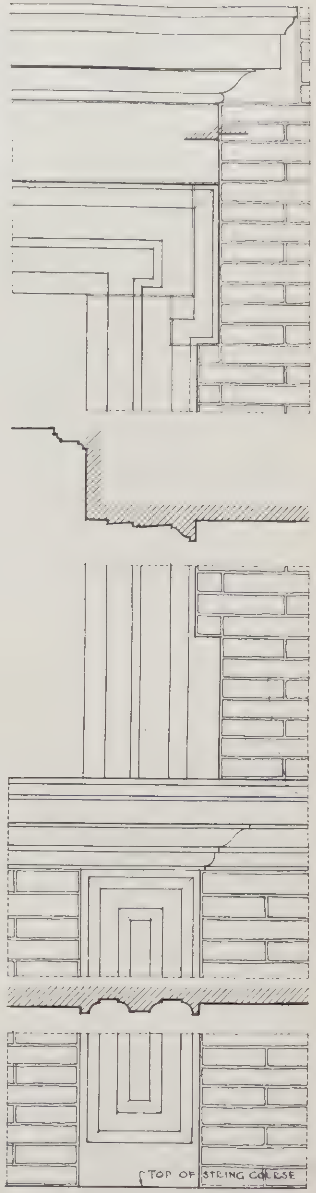

Well Opening in Courtyard



STRING COURSES at 2nd & 3rd STORIES



PRINCIPAL ELEVATION



THIRD STORY WINDOW

SCALE of ELEVATION 3/32 IN = 1 FT.
SCALE of DETAILS 3/8 IN = 1 FT.

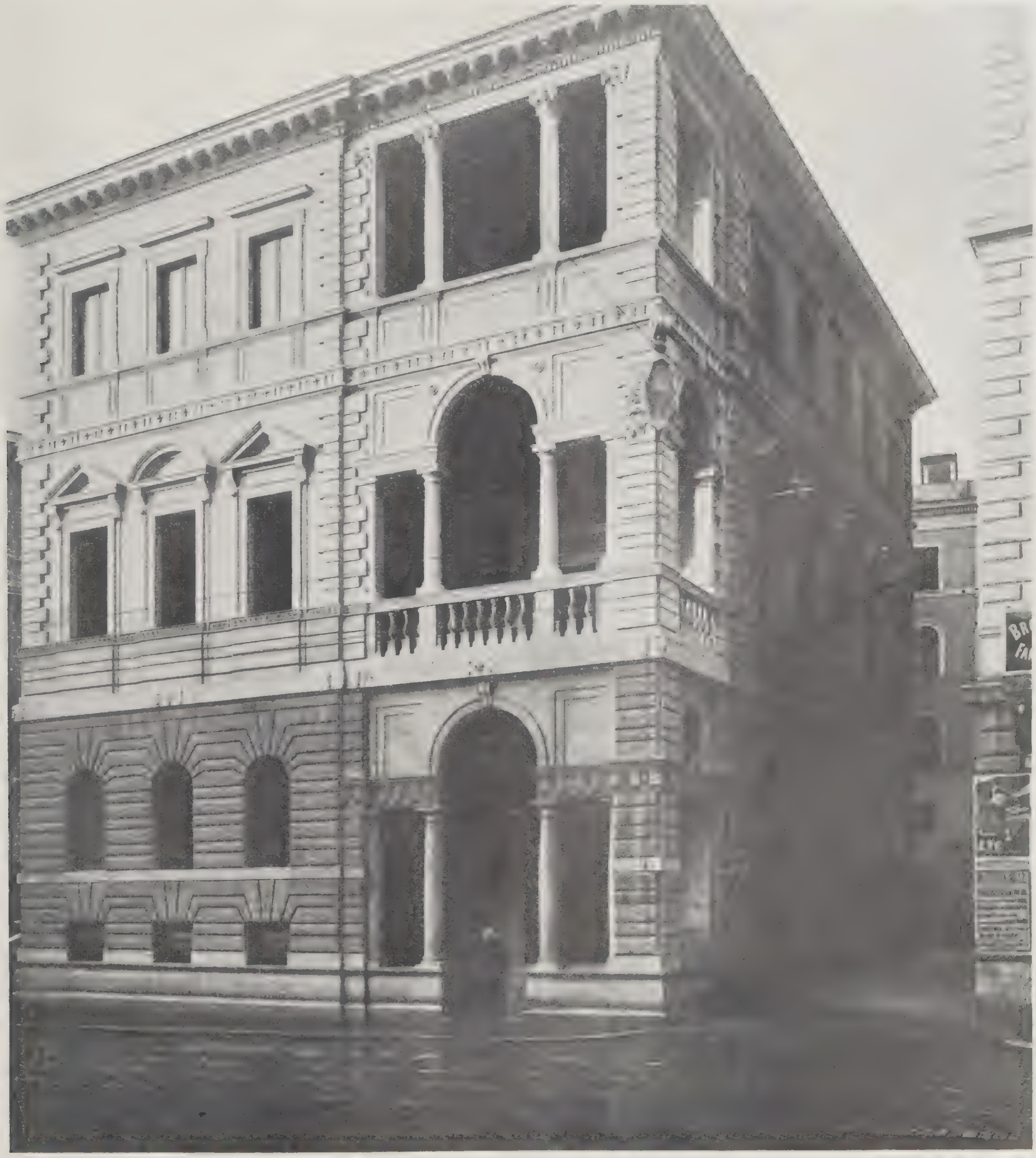
# PALAZZO LINOTTE — ROME

MEASURED and DRAWN by
LLOYD MELVILLE HENDRICK, JR.

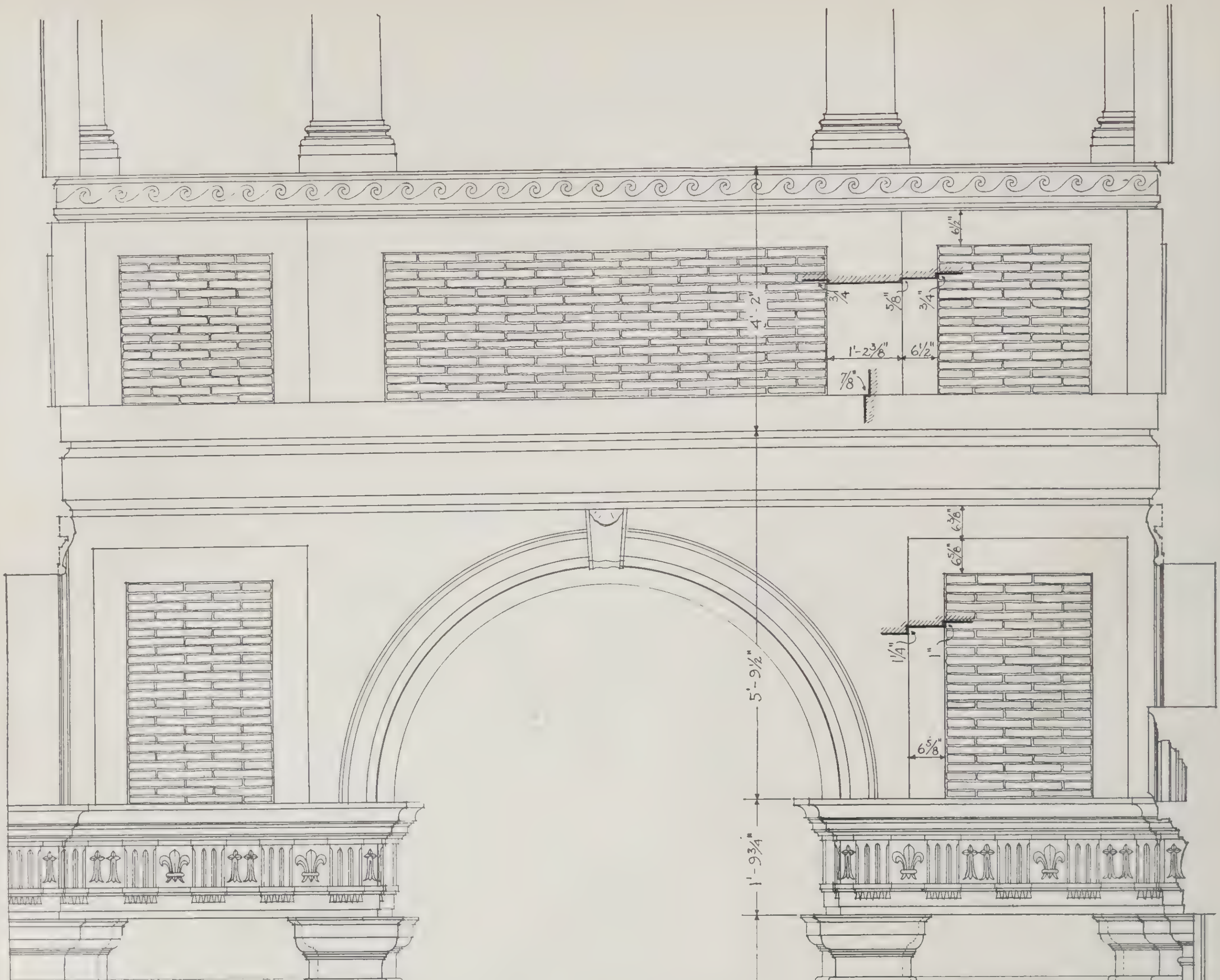
that of the master decorators of the Renaissance, at least it can be truly said that as one views it from the street it is a delight to the eye.

That which was originally the rear elevation is very irregular in composition, largely on account of windows placed on stair landings; and the windows in the bay farthest from the street are jammed hard against the quoins of the corner in a way that not even a generous imagination can excuse. Typical of its period, the principal facade, aside from the end of the loggia, is formal in its arrangement, and the same treatment continues on what we may call the right-hand elevation. A close inspection of the mouldings and carving reveals the "quality" of the author, and may well allow us to say that here was a man of purity of taste and wise in understanding of the true relation of line and surface to visual effects.

Of special interest are several points of detail. A comparison of the capitals of the pilasters with those of the columns in the Tuscan order of the first story shows a considerable flattening of the curve of the echinus in the former; the feeling of support is not stressed where it is not necessary. The architrave of the third story windows, simple in thought, is vitalized by giving the flat surfaces a splay that the eye would never chance upon, but which is clearly brought out by a profile gauge. The capitals



Facade of Palazzo Linotte on Corso Vittorio Emanuele



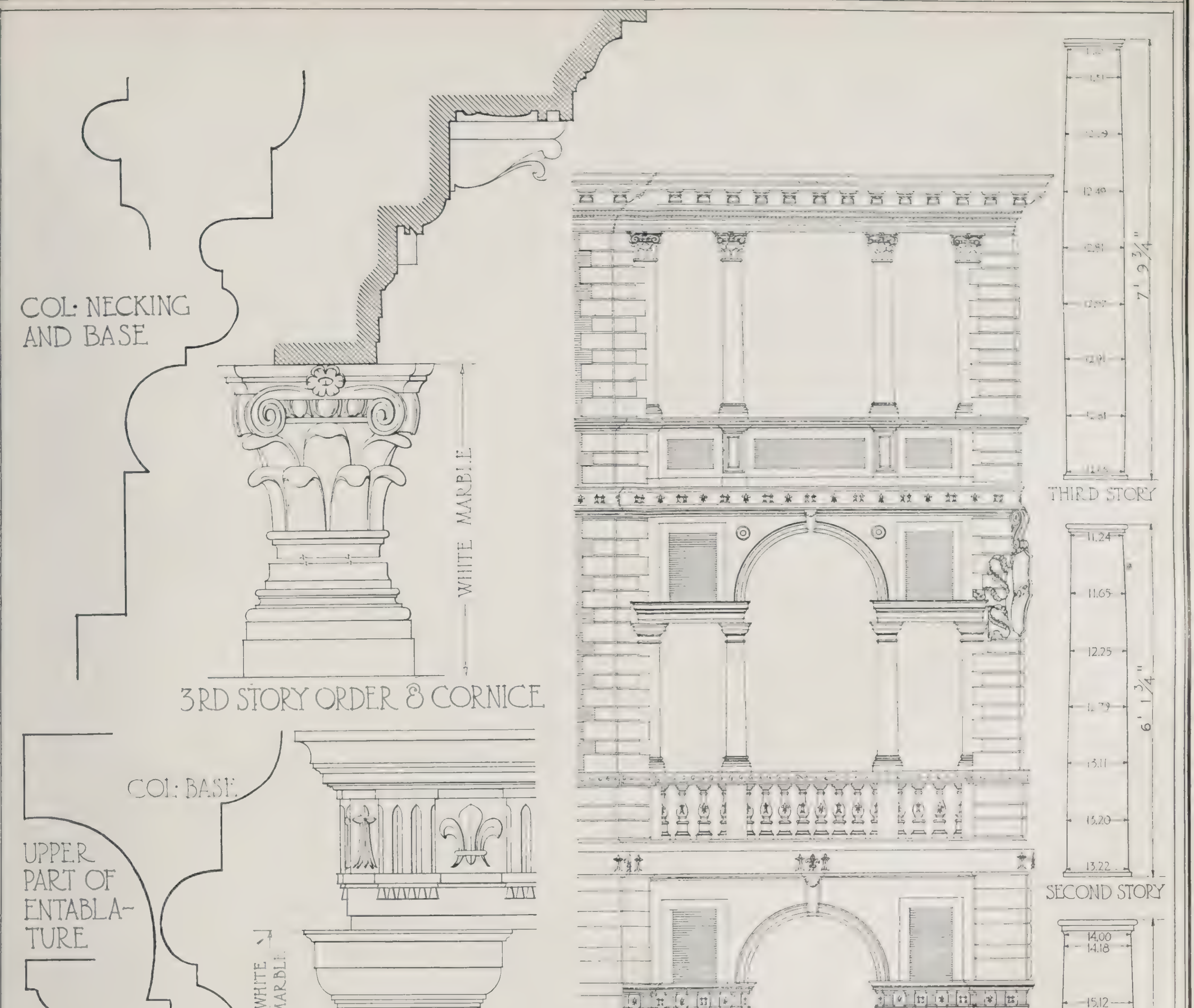
WHITE MARBLE CAPITALS AND BASES WITH GRAY GRANITE SHAFTS ON THESE COLUMNS AND THE PILASTERS BEHIND ALL OTHER STONEWORK IS TRAVERTINE WITH BRICKWORK TO MATCH.

SCALE ⅜ IN· 1 FT·

ELEVATION of FIRST STORY
of LOGGIA in COURTYARD

# PALAZZO LINOTTE · ROME

MEASURED and DRAWN by
LLOYD MELVILLE HENDRICK, JR.



SCALE ⅛ IN. = 1 FT.

TRAVERTINE AND BRICK (SIX COURSES TO 10 INCHES) TO MATCH ARE USED EVERYWHERE EXCEPT AS NOTED ON THE COLUMNS.

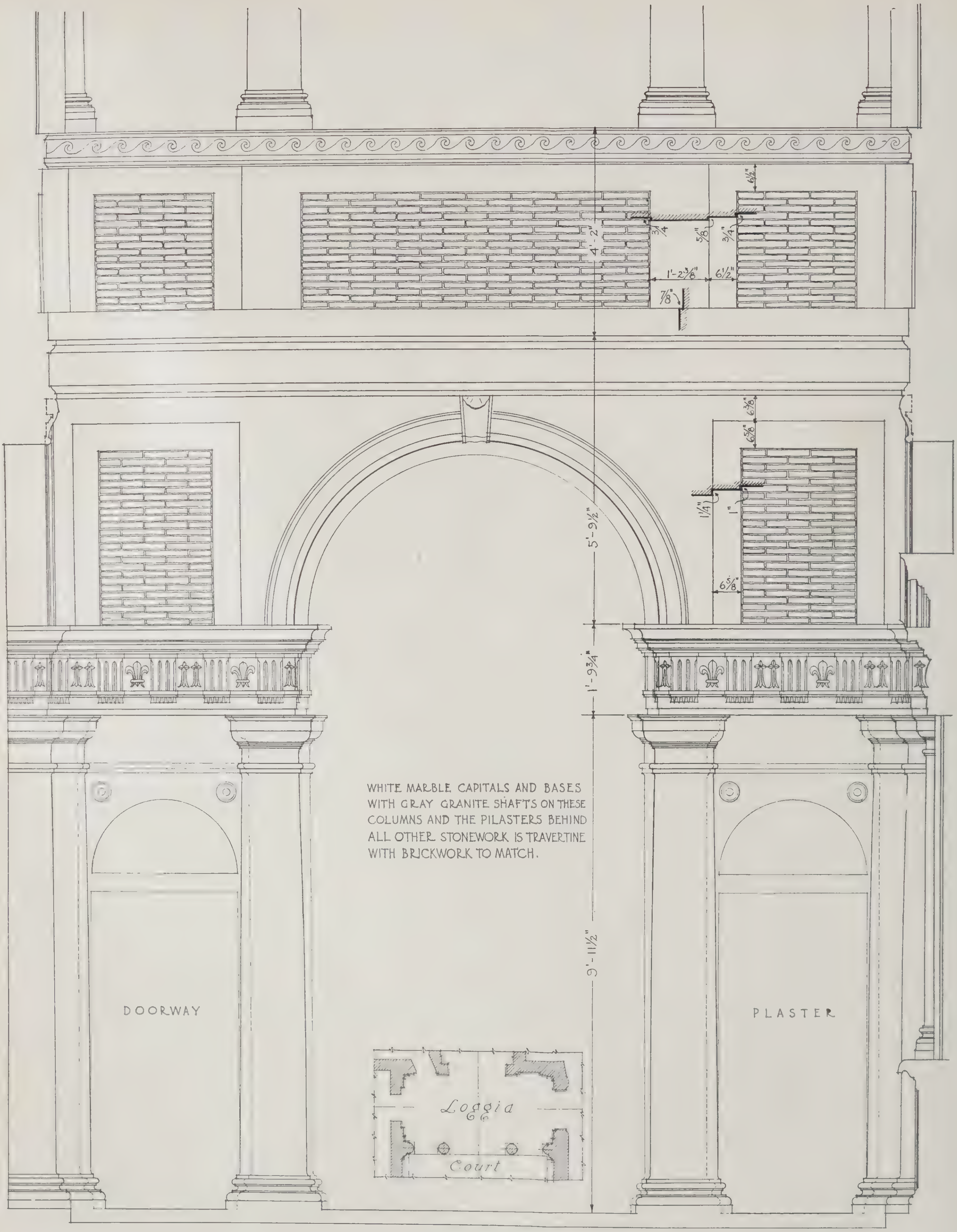
ENTASIS OF COLUMNS
DIMENSIONS GIVEN ARE OF THE DIAMETERS (IN INCHES) TAKEN AT 1 FOOT INTERVALS — ⅜ IN. SCALE

DETAILS AT ¾ IN. SCALE · PROFILES AT ONE-HALF FULL SIZE

Elevation and Details of
Loggias on Street Side

# PALAZZO LINOTTE · ROME

Measured and Drawn by
Lloyd Melville Hendrick, Jr.



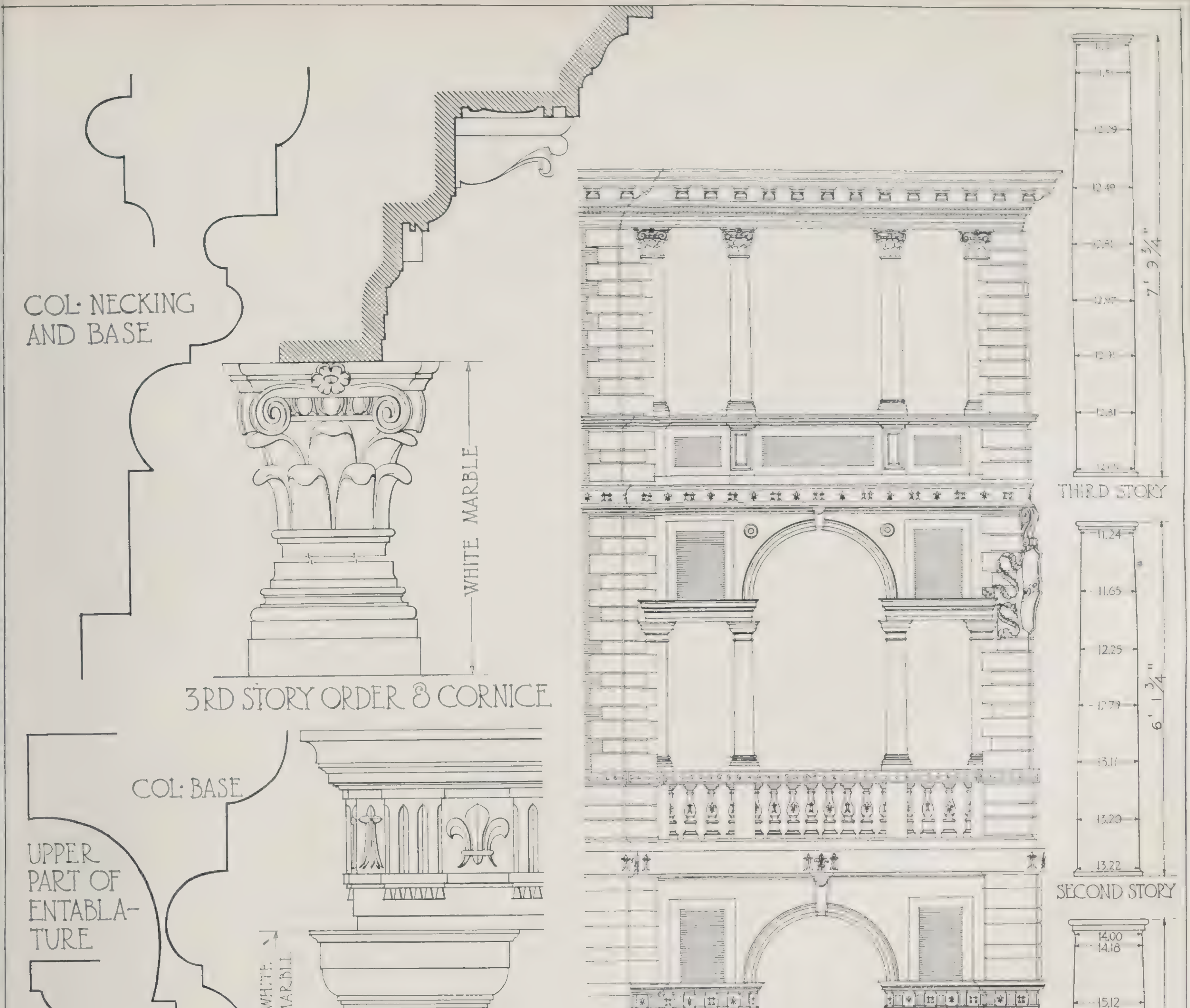
WHITE MARBLE CAPITALS AND BASES WITH GRAY GRANITE SHAFTS ON THESE COLUMNS AND THE PILASTERS BEHIND ALL OTHER STONEWORK IS TRAVERTINE WITH BRICKWORK TO MATCH.

SCALE ⅜ IN· 1 FT·

ELEVATION of FIRST STORY
of LOGGIA in COURTYARD

# PALAZZO LINOTTE · ROME

MEASURED and DRAWN by
LLOYD MELVILLE HENDRICK, JR.



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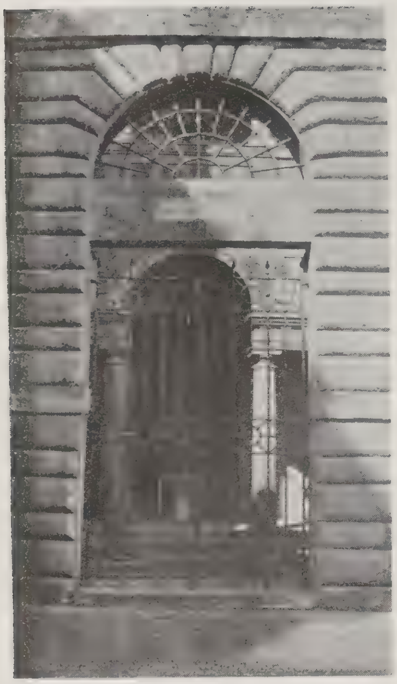
ENTASIS OF COLUMNS
DIMENSIONS GIVEN ARE OF THE DIAMETERS (IN INCHES) TAKEN AT 1 FOOT INTERVALS – ⅜ IN. SCALE

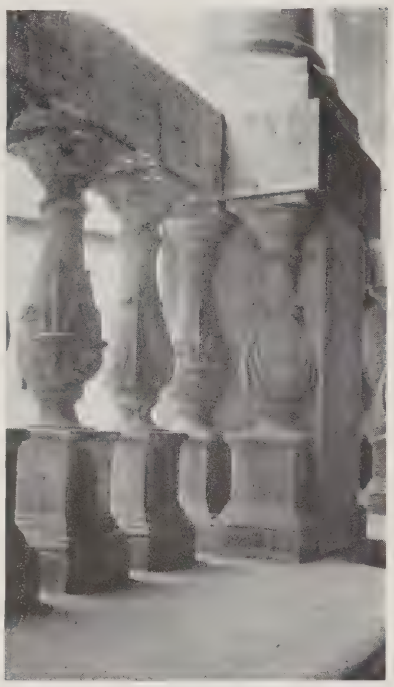
DETAILS AT ¾ IN. SCALE • PROFILES AT ONE-HALF FULL SIZE

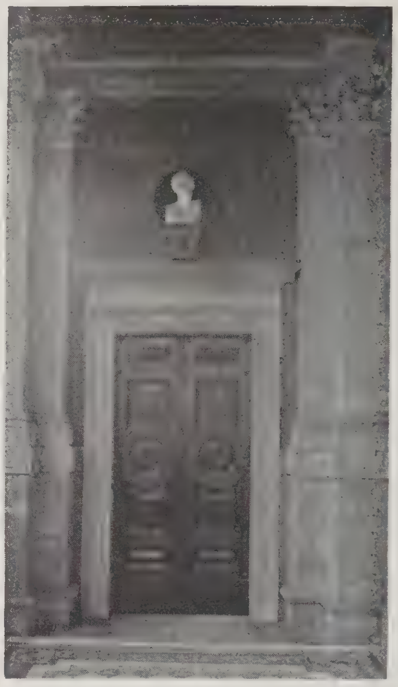
ELEVATION *and* DETAILS *of*
LOGGIAS *on* STREET SIDE

# PALAZZO LINOTTE • ROME

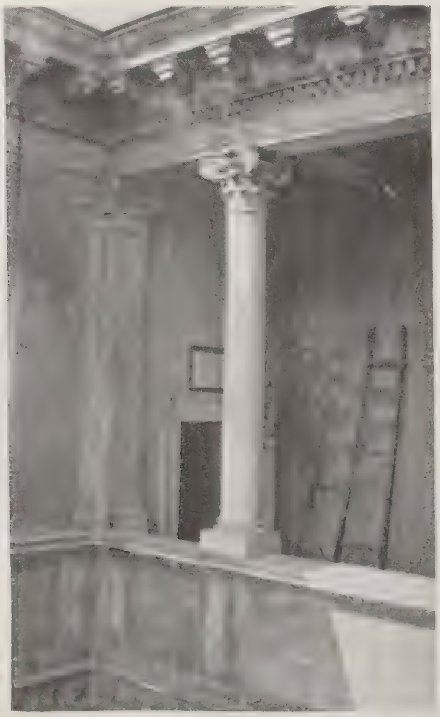
MEASURED *and* DRAWN *by*
LLOYD MELVILLE HENDRICK, JR

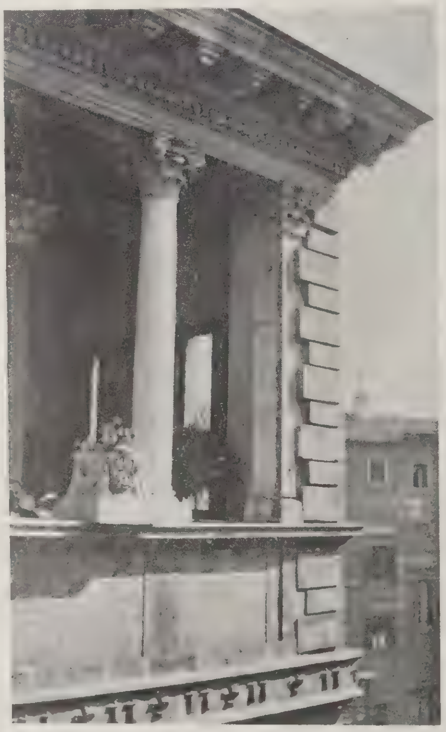

Rear Gate Looking into Courtyard


Balustrade Detail of Second Story Loggia


Doorway at End of Third Story Loggia

of the third story order in the loggia are rather wide-spreading for the slender columns under if we judge by the drawing, but they bear up perfectly the cornice above that is proportioned for the building. The stonework is made to yield its maximum interest through the use of rusticated surfaces, mouldings, etc., rather than by a weak dependence upon joints; hence these are rarely visible except when one looks for them. Each of the upper stories is set back but very slightly from that beneath it; here is the desire to anticipate the effect of leaning outward. By such means as these, applied to a structure of excellent proportions and well chosen elements, did the designer evolve a work that has already been copied almost exactly elsewhere in Rome, and has furnished the motif for one of New York's most graceful banks. By reason of its moderate scale and the comparatively simple character of its ornament the palazzo possesses an unusual value as an architectural study.


Detail of Court Loggia


Detail of Exterior Loggia

# Stained Glass Construction and Details—I

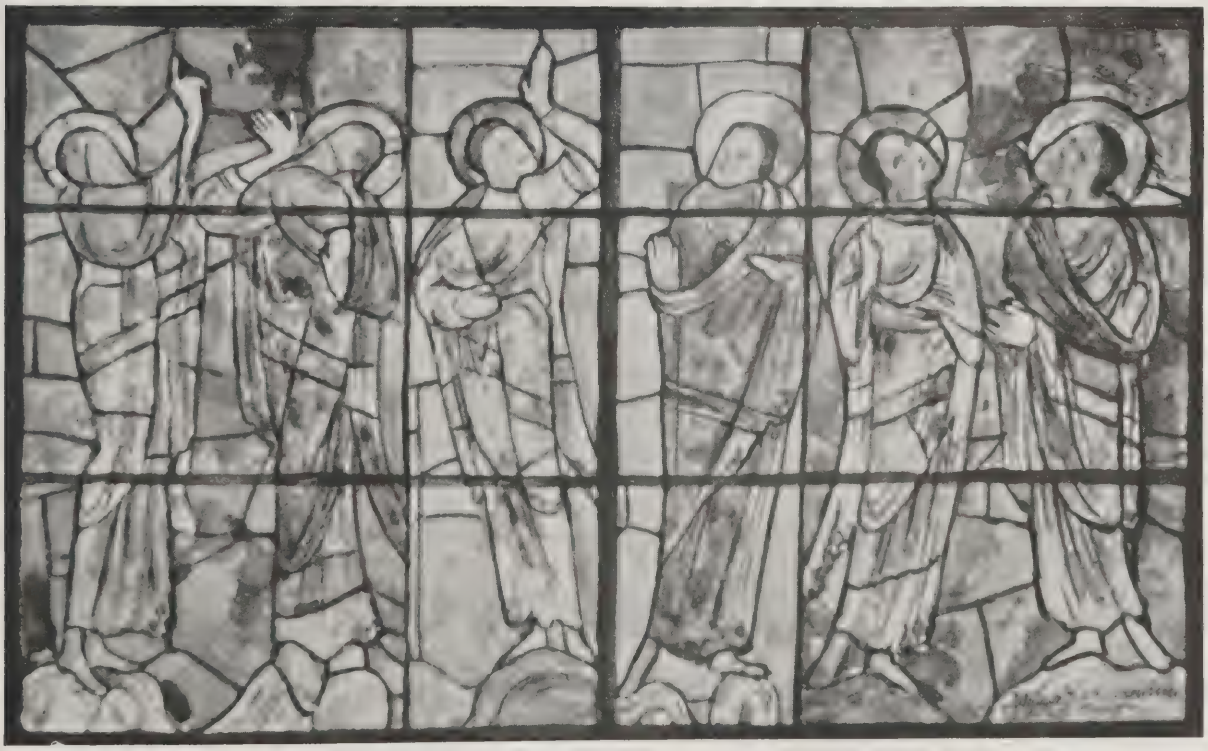
*By* WILBUR HERBERT BURNHAM, *Artist-Craftsman*

*With Illustrations by the Author*

TO the greatly increasing number of American architects who are creating a high type of art, based upon beautiful and lasting architectural models, stained glass has a strong appeal. Its proper use enhances, while its misuse utterly spoils, any architectural interior. The principles governing the designing and making of an ideal stained glass window, together with uncraftsmanlike methods and their results, are briefly illustrated in this article, which will be followed with a description of the many interesting processes necessary to the making and installing of a window. There will also be illustrations and descriptions of the details which architects should observe carefully in order to be sure that the preparatory work done by building mechanics is in the right direction and, when installed in the building, is ready and proper to receive the leaded glass.

*Mediæval Glass.* In the many books written on the subject of stained glass, varied opinions have been expressed relative to the merits of mediæval work, from its beginning, through the centuries, and into its decline. Although some writers have preferred fourteenth century work, others fifteenth century and so on, they have agreed that the barbaric richness of color and simplicity of twelfth and thirteenth century stained glass were, in the succeeding periods, unequaled. The two dominant colors used in the early work, red and blue, were of pure and mysterious hues, the red streaky, and the blue a wonderful liquid cobalt. The blue of twelfth century work was of a lighter quality, described many times as a "heavenly" blue. These mediæval craftsmen in stained glass drew in the spirit of the age in which they lived, and the utmost simplicity and purely decorative quality of their figures serve as a valuable object lesson for the decorator of to-day. Their task was always accomplished in the most direct manner, devoid of meaningless embellishments.

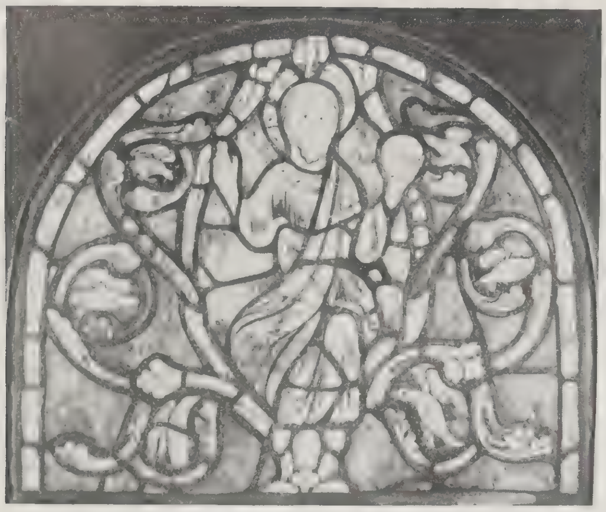
The illustration on page 61 is from a water color of the famous window known as the *Notre Dame de la Belle Verriere.* It is impossible to gain a proper appreciation for this masterpiece in glass without seeing it in its place in the choir ambulatory of Chartres Cathedral. This great cathedral is rightly called the holy of holies of stained glass, for without doubt it contains the most wonderful collection of mediæval windows in all the world. The Virgin with the Child on her knee is the work of the twelfth century, while the remainder of the window, outside of the great central panel, is thirteenth century. It is the common belief, that during the disastrous fire in the cathedral the Virgin and Child panel was rescued, and when the cathedral was rebuilt, the window was restored by the craftsmen of the



Portion of Ascension Window, Le Mans Cathedral

Late eleventh century; earliest window extant

*From Painting by Wilbur Herbert Burnham*



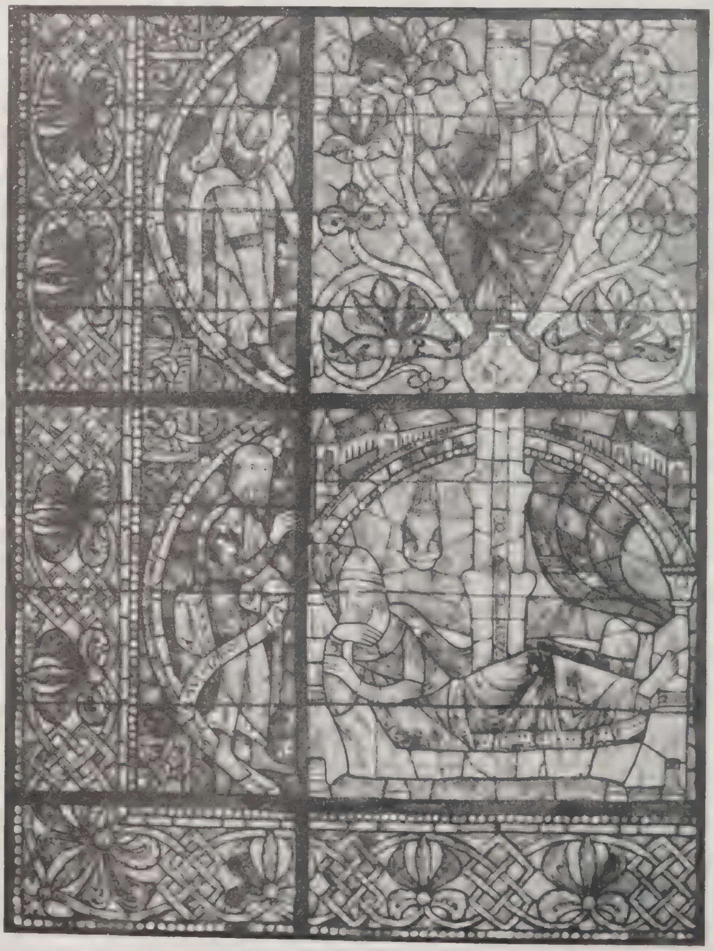
Portion of Jesse Window, Trocadero, Paris
*From Painting by Wilbur Herbert Burnham*

thirteenth century. Although this window as a whole is a remarkable example of stained glass, the crowning glory is the twelfth century portion, with its daring background of a deep, rich and glowing ruby, set with jewels of blue. The virgin is robed in garments of light blue, a color seldom seen in later work; the design and color in this panel are of a simple grandeur never equaled in later periods. The Byzantine style of drawing and severity of design together with its remarkably simple dignity, and the noticeably larger pieces of glass, are characteristics of the twelfth century portion that stand out. The remaining parts of this noble window, typically thirteenth century in character, show an advance in draftsmanship and a desire to tell stories in individual medallions. Although the same breadth of design and simple harmony of color in the central panel are partly lost, the work is still distinctly craftsmanlike and mosaic in character.

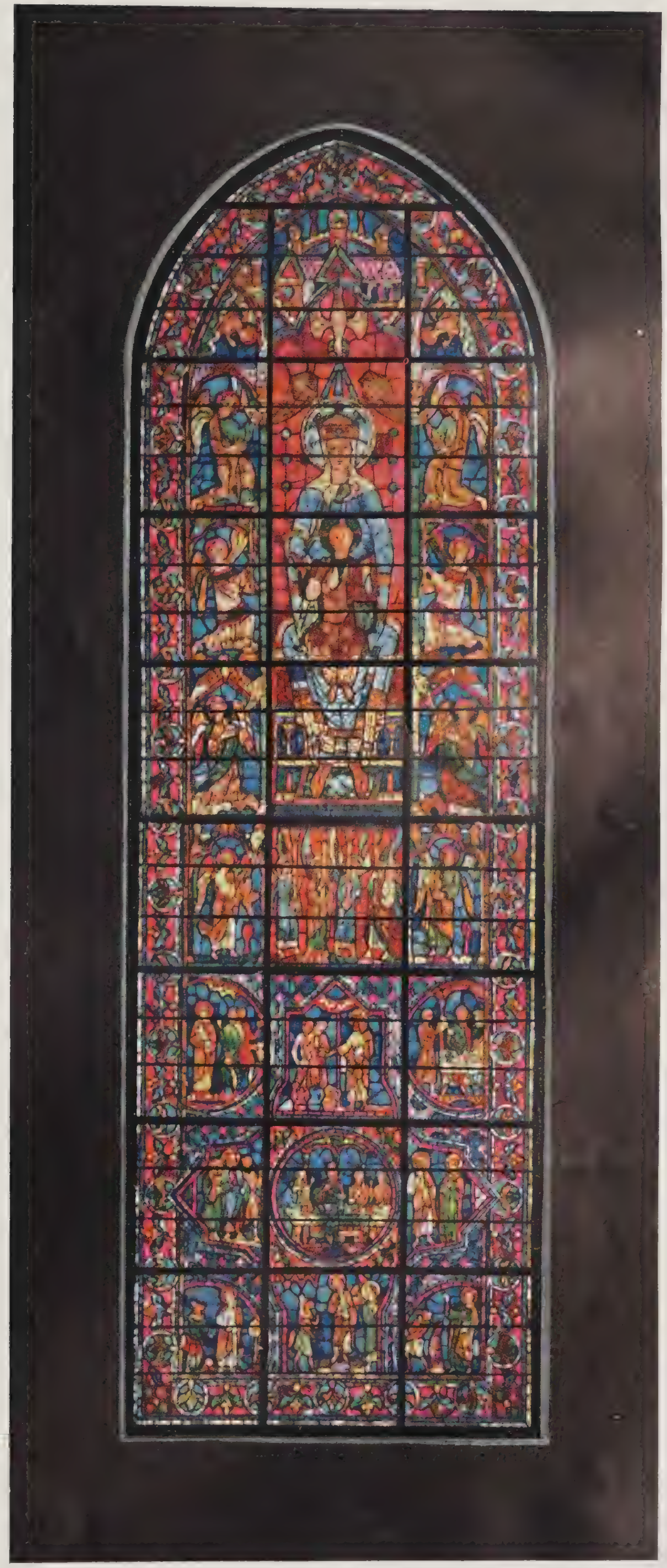
In this marvelous window of colored glass, all the characteristics of twelfth and thirteenth century work may be studied. That the artist-craftsmen who made this window were colorists par-excellence is proved by their daring use of red and blue. Just the right proportions of white, gold and green are woven through the entire composition to give a perfect balance in color and at the same time offset any possibility of a disagreeable purplish effect. The figures, while naïvely drawn, are conceived in a direct, decorative manner, with no attempt at realism. For centuries this truly great window has inspired lovers of art, and is a striking example of what the ideal window should be, with its flat, symbolic representations.

*Transitional Period.* The fourteenth century, or transitional period, as it is commonly called, saw perhaps advances in the technical side of the art of stained glass, but the old ideals were lost, and in place of rich color and simple treatment there developed realism and gray coloring, with naturalistic ornament, and the early Byzantine influence vanished. One problem, however, was solved in this period. A growing desire for lighter churches resulted in a combination of single figures and *grisaille,* a new type of ornament in white glass, geometric in design, with interlacing bands of color. A delicately traced foliated pattern on the white glass subdued the glaring light and gave to the window an extremely soft and beautiful light. The invention of the stain, to which later reference will be made, helped materially to blend the white glass with the colored figures. The canopy work, which in earlier glass was but a part of the whole design, as in the top of the *Belle Verriere,* became more important than the figures. Subjects became a rarity, and the single figures, all more or less alike, were beginning to take on an effect of high relief in modeling and a delicacy of rendering.

*Late Gothic Glass.* The fifteenth century, or late Gothic period, was noteworthy for its advanced and delicate style of drawing, increased use of stain, and pinnacled canopies. The canopies, now almost all



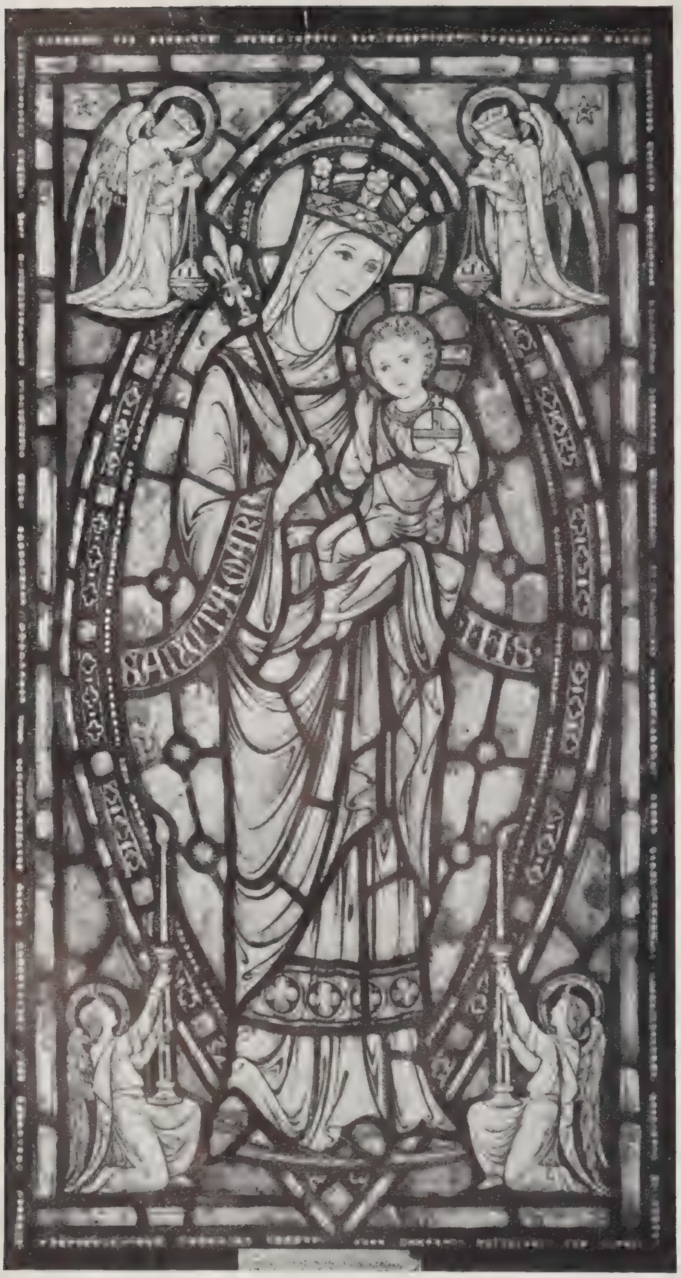
Portion of Jesse Window, Twelfth Century, Chartres Cathedral
*From Painting by Wilbur Herbert Burnham*



WINDOW OF *NOTRE DAME DE LA BELLE VERRIERE*, CHARTRES CATHEDRAL

*From Water Color by Wilbur Herbert Burnham*

The Virgin with the Child is the work of the twelfth century, while the remainder of the window, outside of the great central panel, is thirteenth century



Medallion Designed and Executed by Wilbur Herbert Burnham

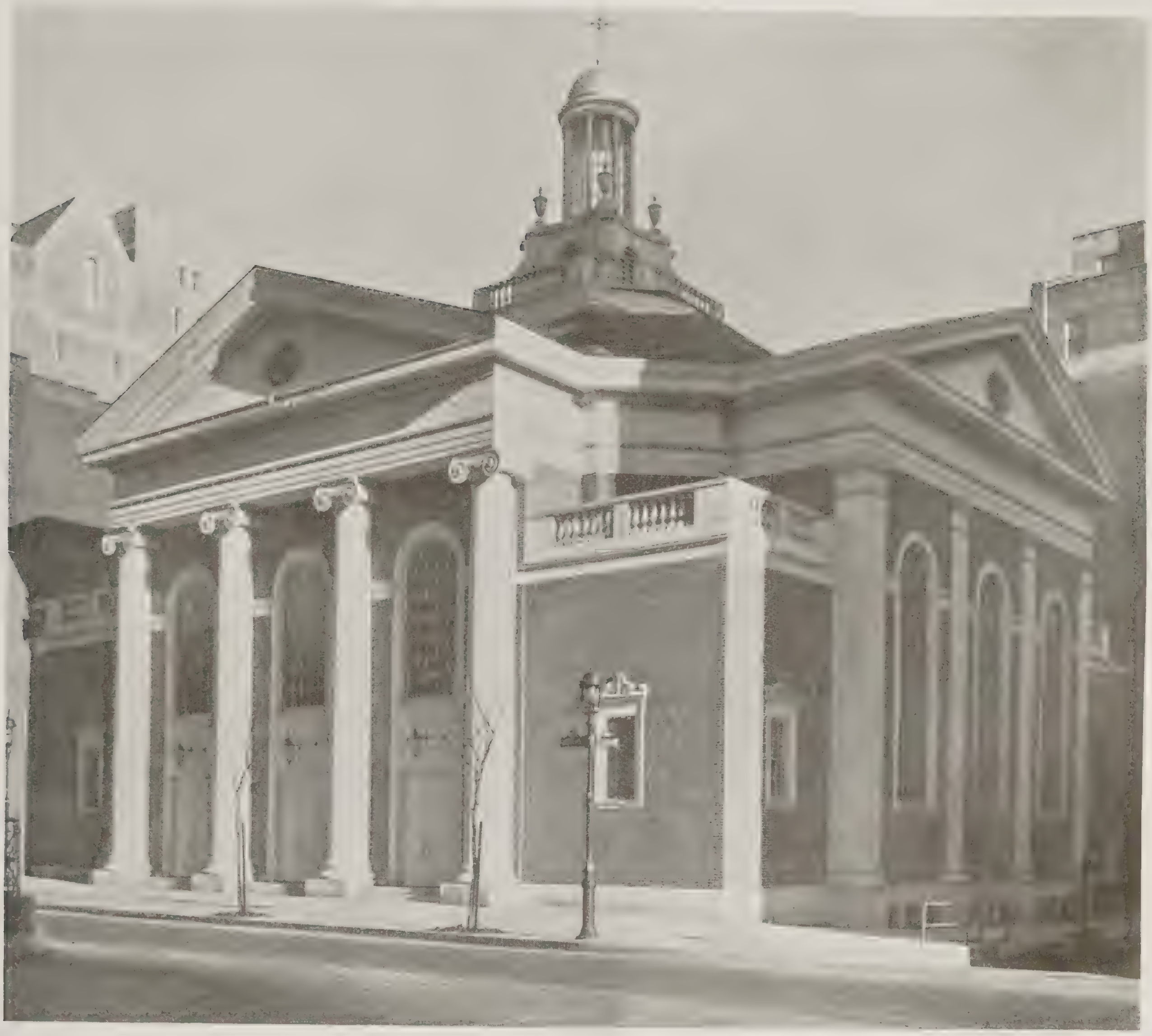
In this medallion the charm of mosaic color and simplicity of design of the twelfth and thirteenth centuries are combined with the delicacy in the drawing of the fifteenth century

white, enhanced by the stain, became better proportioned and more delicate, and naturalistic ornament was abandoned. The one great loss, however, was the very noticeable lack of mosaic character, due in a large measure to the common use of stain. Leading became minimized, for with the use of stain, larger pieces of glass could be used to advantage, with truly beautiful results, however. Unlike the twelfth and thirteenth century craftsmen, who really drew their designs in lead, the fifteenth century worker was leading to fit his design. His progress in the technique of painting was remarkable, but the tendency was to rely more on the paint than on the glass itself, which on the whole was somewhat gray and subdued in color.

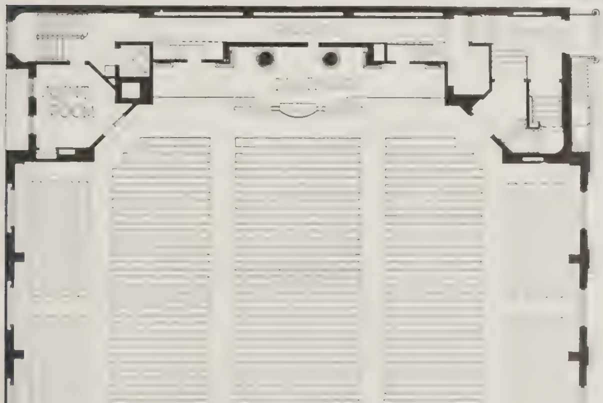
*Renaissance Glass.* Picture windows came into vogue in the sixteenth century, beautiful in drawing and in the technique of painting, but showing withal an absolute disregard for the fundamental principles of the craft. Enamel colors were discovered, and the glass painter could at last paint a realistic picture. Large sheets of white glass were employed, and the painter was not hampered by lead lines. But his pictures on glass were absolute failures; the soft enamel colors were not permanent, and in time peeled off the glass, leaving patches of white glass over the window. It must be admitted, that although the sixteenth century worker in glass was not a decorator in any sense, he was a painter of a very high order. But alas! His wonderful painting on glass soon lost its glory and became a dull, lifeless imitation of a painting on canvas. A rapid decline in the art followed, and in the seventeenth and eighteenth centuries it became virtually one of the lost arts, until in the age of Pugin and the great Gothic revival in England a new interest in the art developed, and its lost ideals were restored. Especially in England, stained glass windows became greatly in demand, and the artists in glass received a new inspiration.

Unfortunately, however, this great demand for windows in colored glass soon caused the introduction of commercialism, resulting in a great number of deplorable windows, the productions of large stained glass firms in Germany, England and America. Many of these factories still exist, turning out windows on a huge scale. While, to be sure, these windows have in themselves a certain merit, as did the picture windows of the Renaissance, nevertheless, a direct sinning against the true principles of craftsmanship is much in evidence, and the intrinsic beauty of the material is of secondary importance.

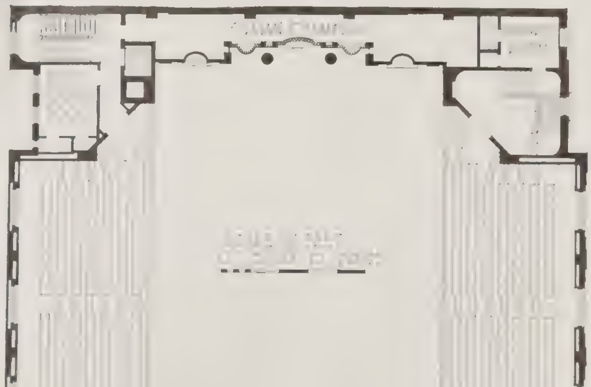
This condition is partially responsible for the sincere efforts on the part of several of our honest artist-craftsmen to place the art on the high plane it is beginning to occupy, and their influence is being felt. The future for the noble art is most encouraging, and American craftsmen are doing their full share in this new great revival. Our architects who are striving sincerely to create cathedrals and churches to inspire the Christians of today and of the future will find in many modern craftsmen in stained glass a spirit of hearty coöperation, and a sincere desire to create windows worthy of a place in the House of God, but there are countless instances where unworthy glass has marred, when it has not irreparably ruined, the noblest efforts of architects. Windows are among the details of a building that cannot be hidden.



GENERAL EXTERIOR VIEW



MAIN FLOOR PLAN

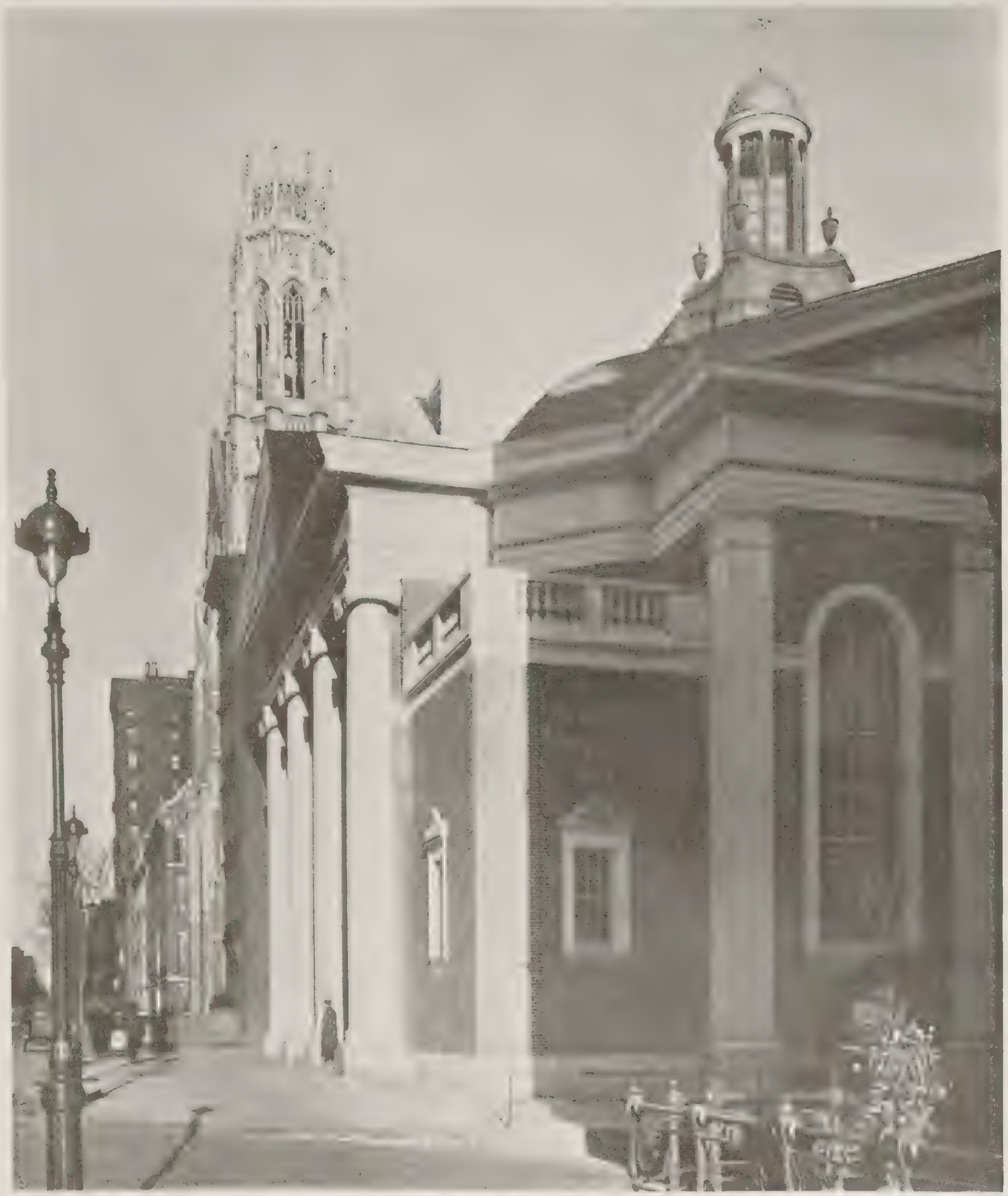


GALLERY FLOOR PLAN

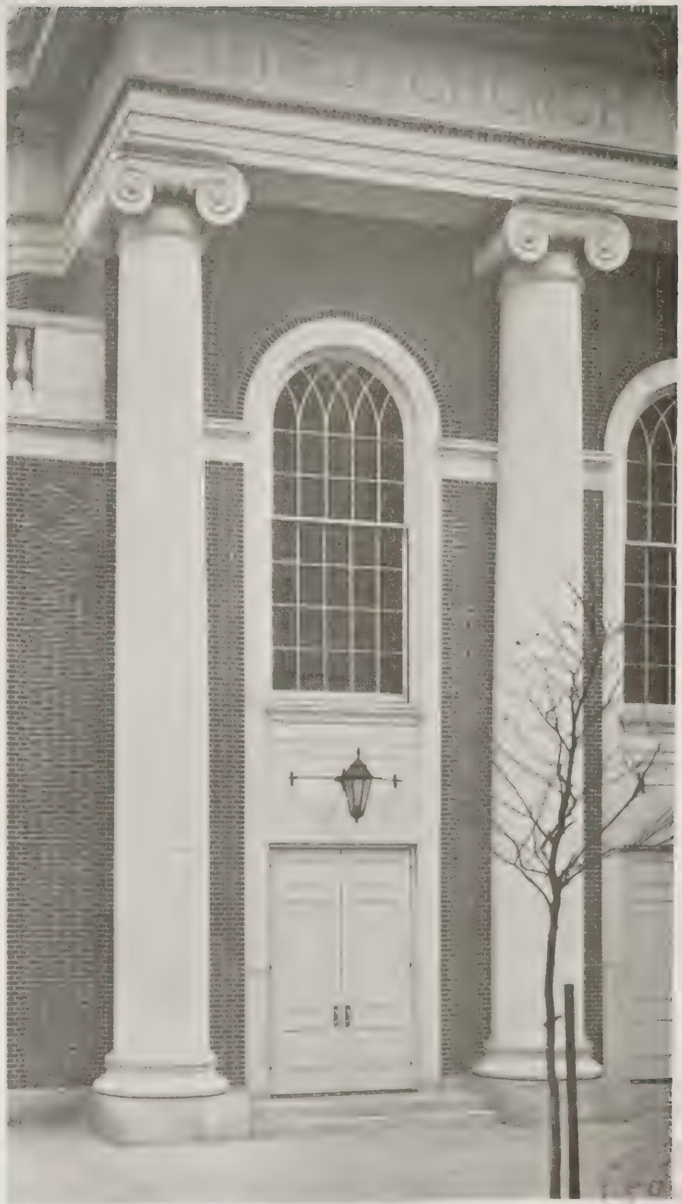
THIRD CHURCH OF CHRIST, SCIENTIST, PARK AVENUE, NEW YORK

DELANO & ALDRICH, ARCHITECTS

*Photos, Paul J. Weber*



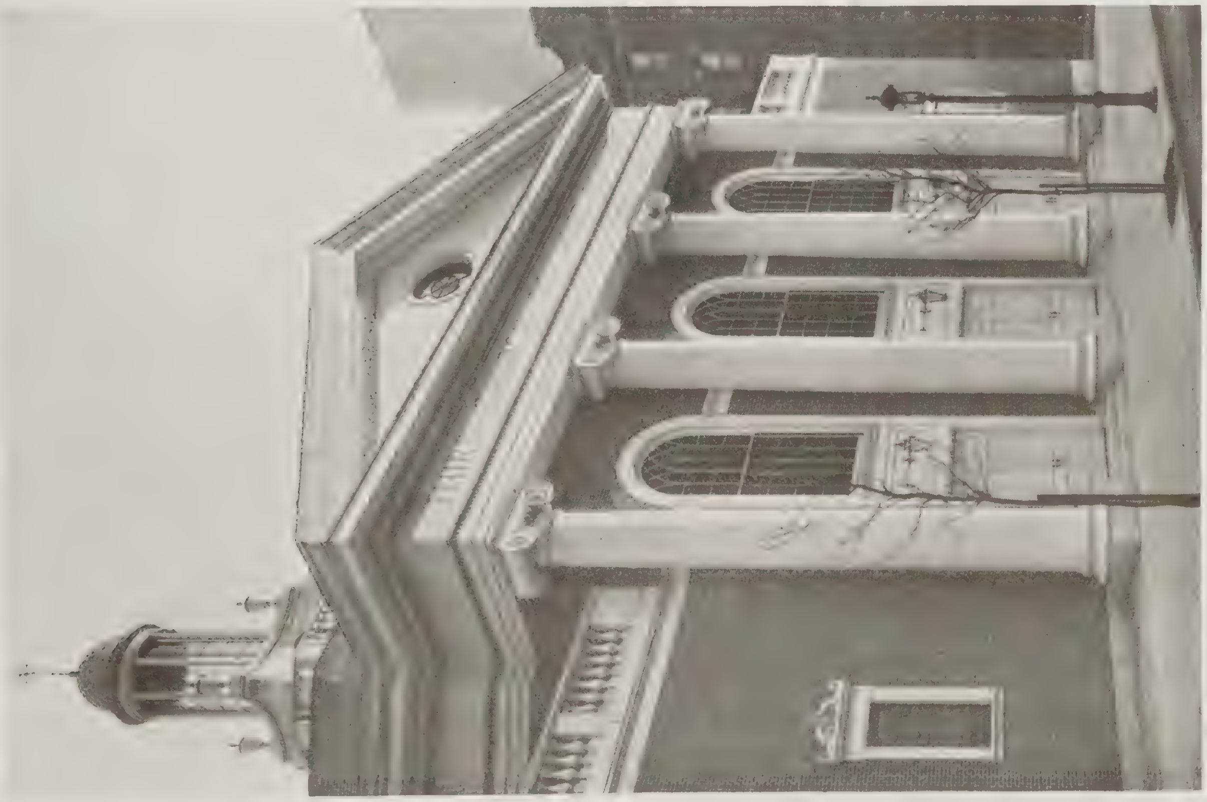
VIEW FROM THE SOUTH



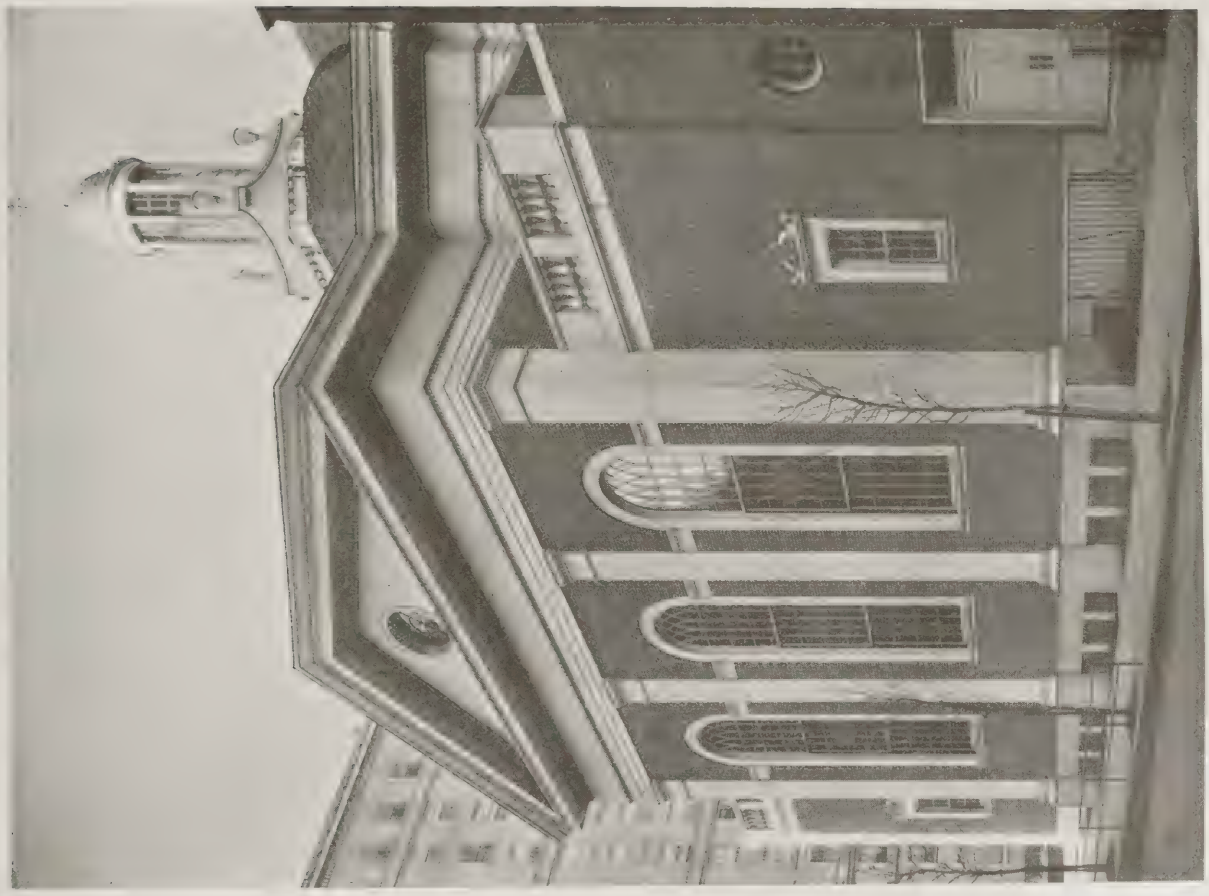
DETAIL OF ORDER

THIRD CHURCH OF CHRIST, SCIENTIST, PARK AVENUE, NEW YORK
DELANO & ALDRICH, ARCHITECTS

DETAIL OF FACADE

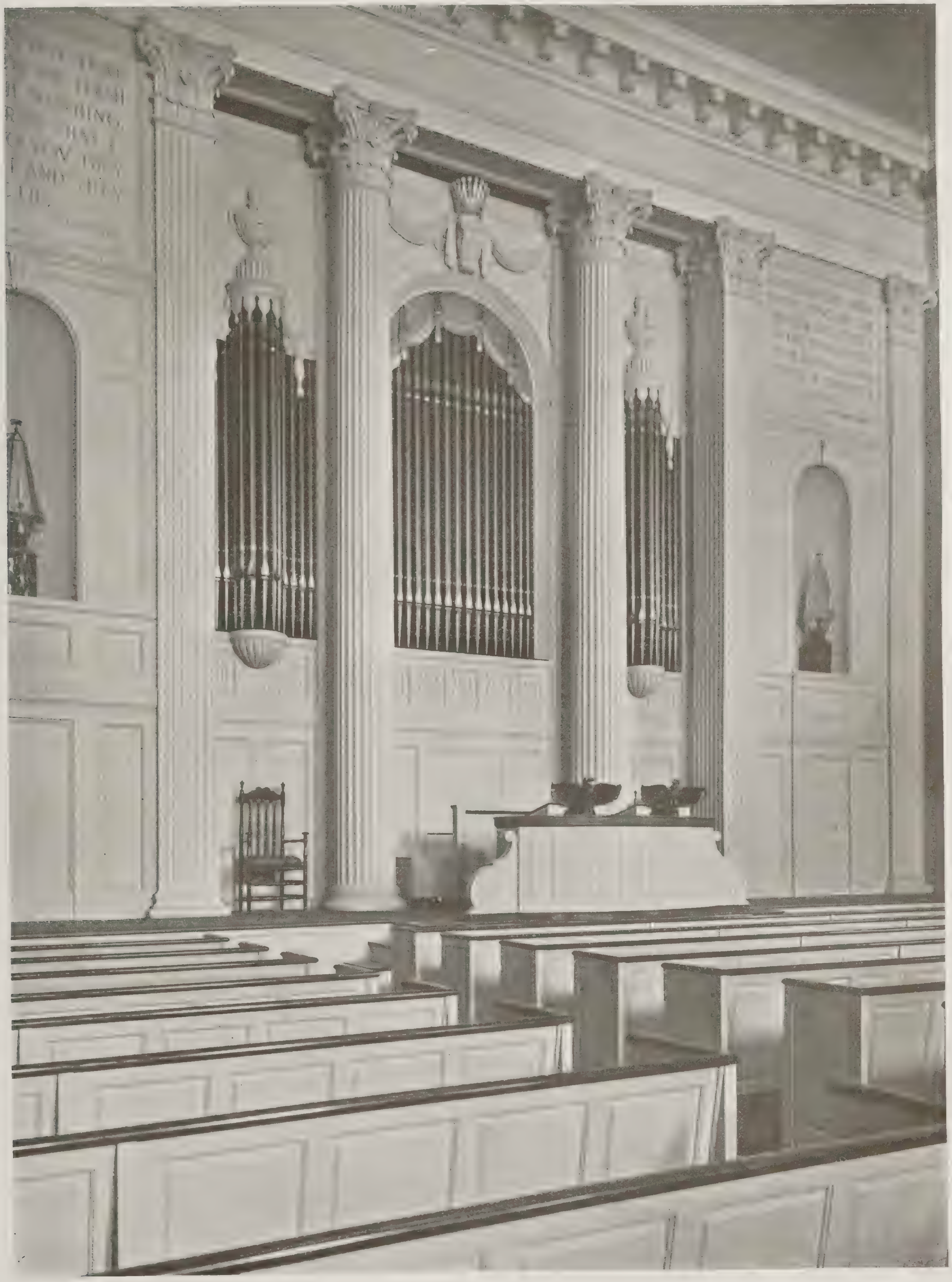


DETAIL OF SOUTH SIDE

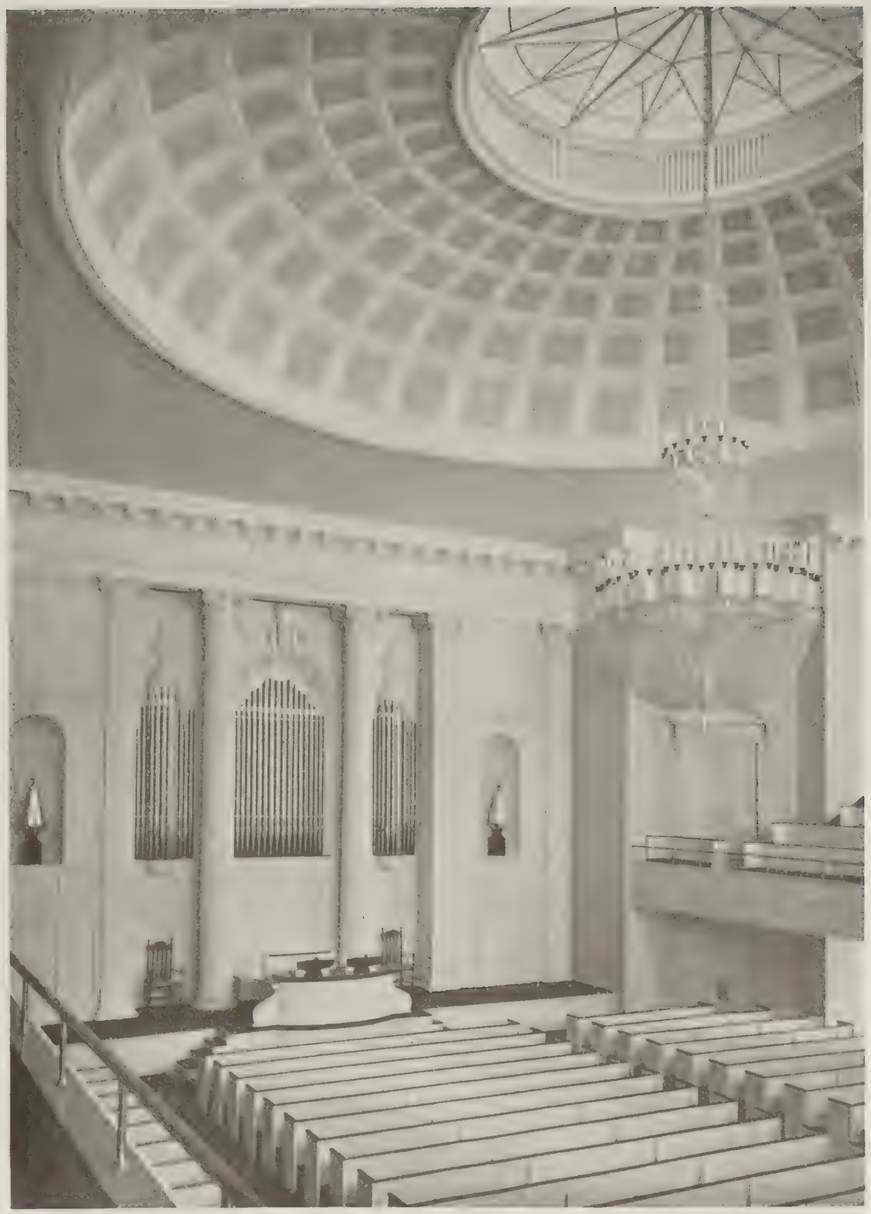


THIRD CHURCH OF CHRIST, SCIENTIST, PARK AVENUE, NEW YORK

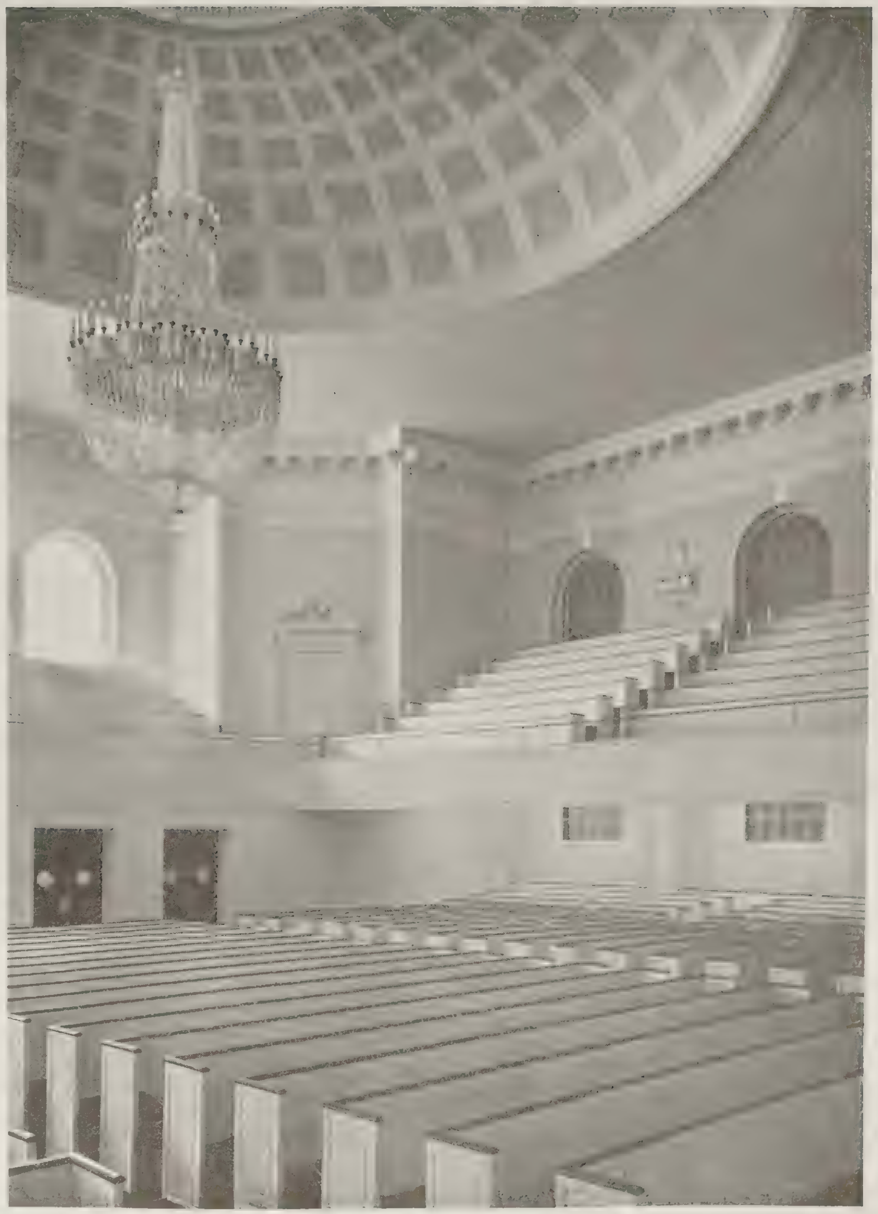
DELANO & ALDRICH, ARCHITECTS



DETAIL OF PLATFORM AND ORGAN SCREEN
THIRD CHURCH OF CHRIST, SCIENTIST, PARK AVENUE, NEW YORK
DELANO & ALDRICH, ARCHITECTS



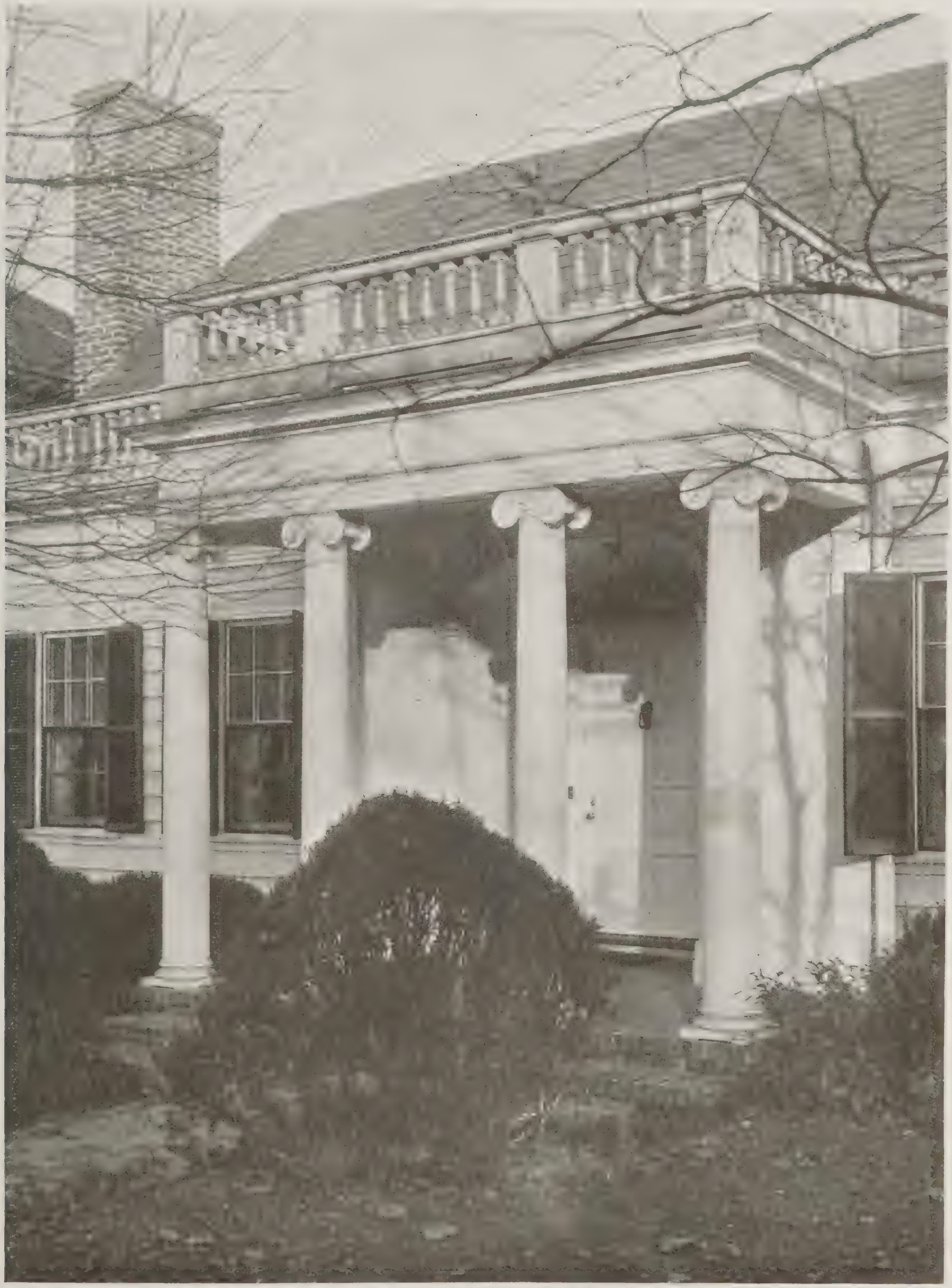
VIEW LOOKING TOWARD PLATFORM



VIEW LOOKING TOWARD ENTRANCE

THIRD CHURCH OF CHRIST, SCIENTIST, PARK AVENUE, NEW YORK

DELANO & ALDRICH, ARCHITECTS

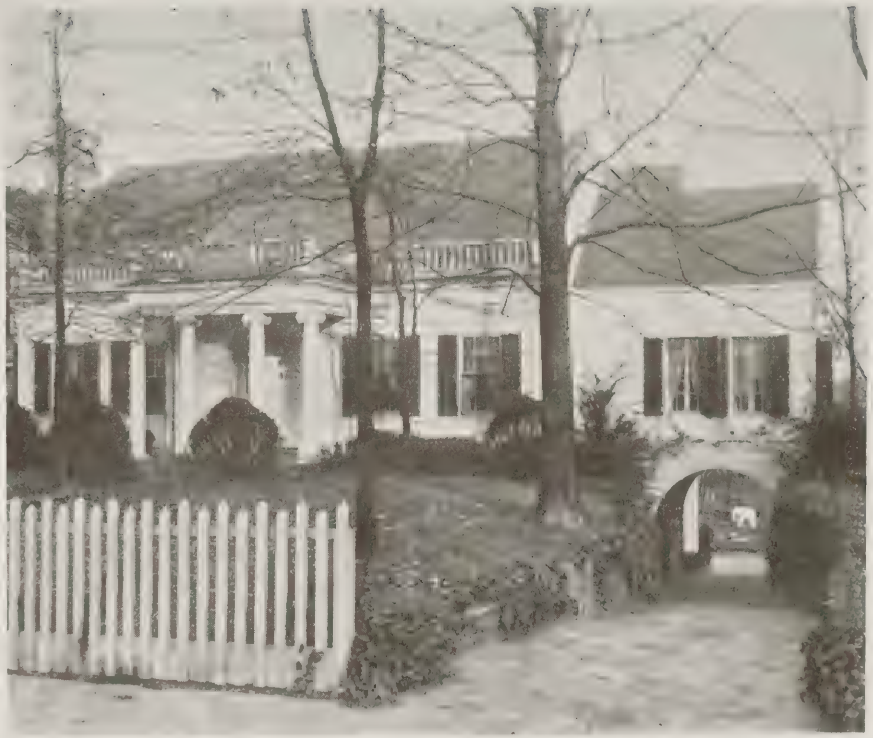


DETAIL OF ENTRANCE PORCH

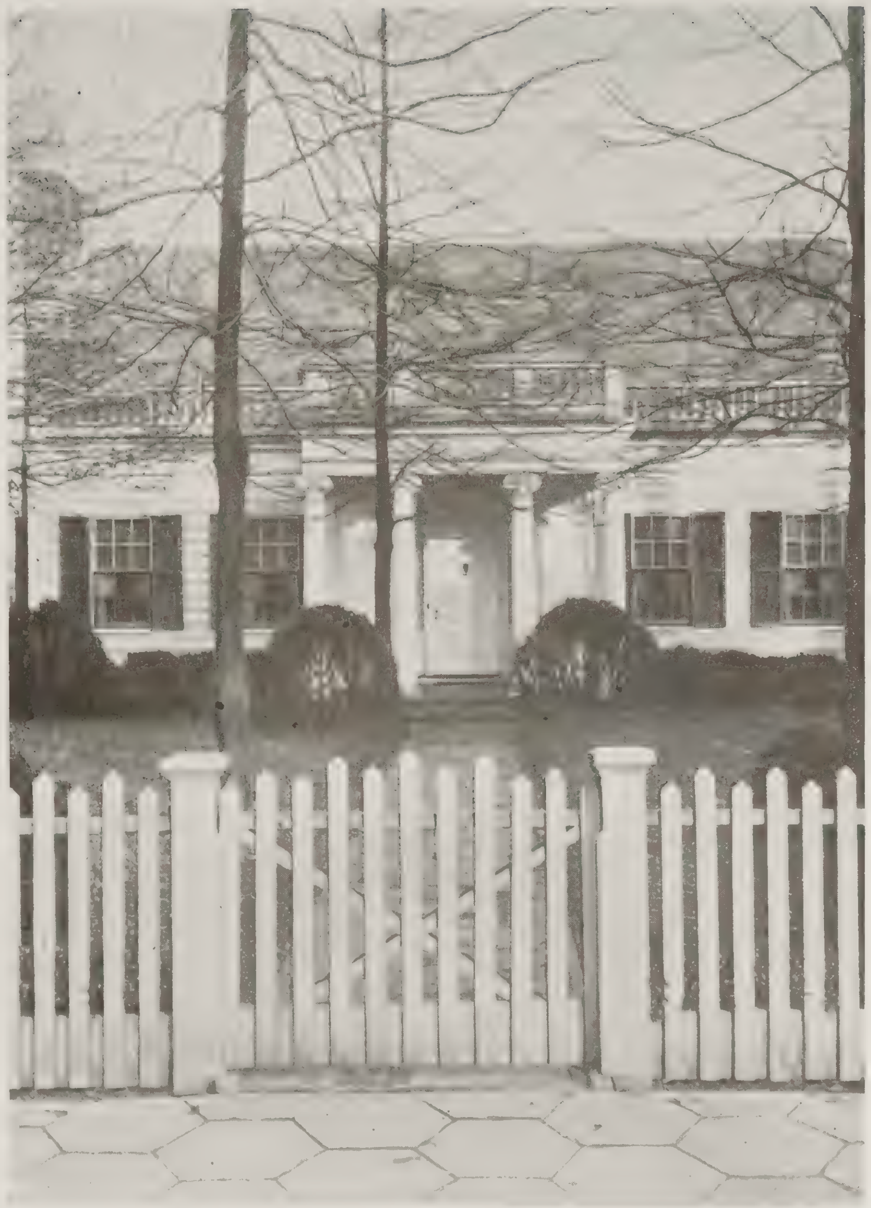
HOUSE OF HUNTER PERRY, ESQ., ATLANTA

HENTZ, REID & ADLER, ARCHITECTS

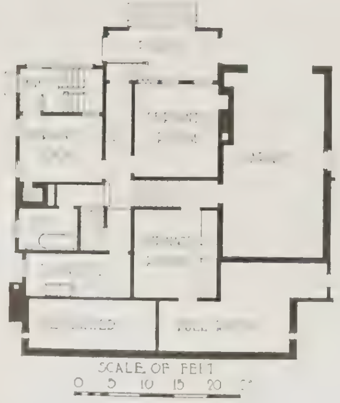
*Photos, Tebbs & Knell, Inc.*



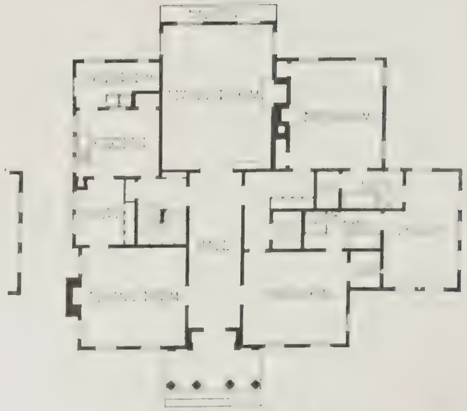
GENERAL VIEW OF FRONT



VIEW FROM THE STREET

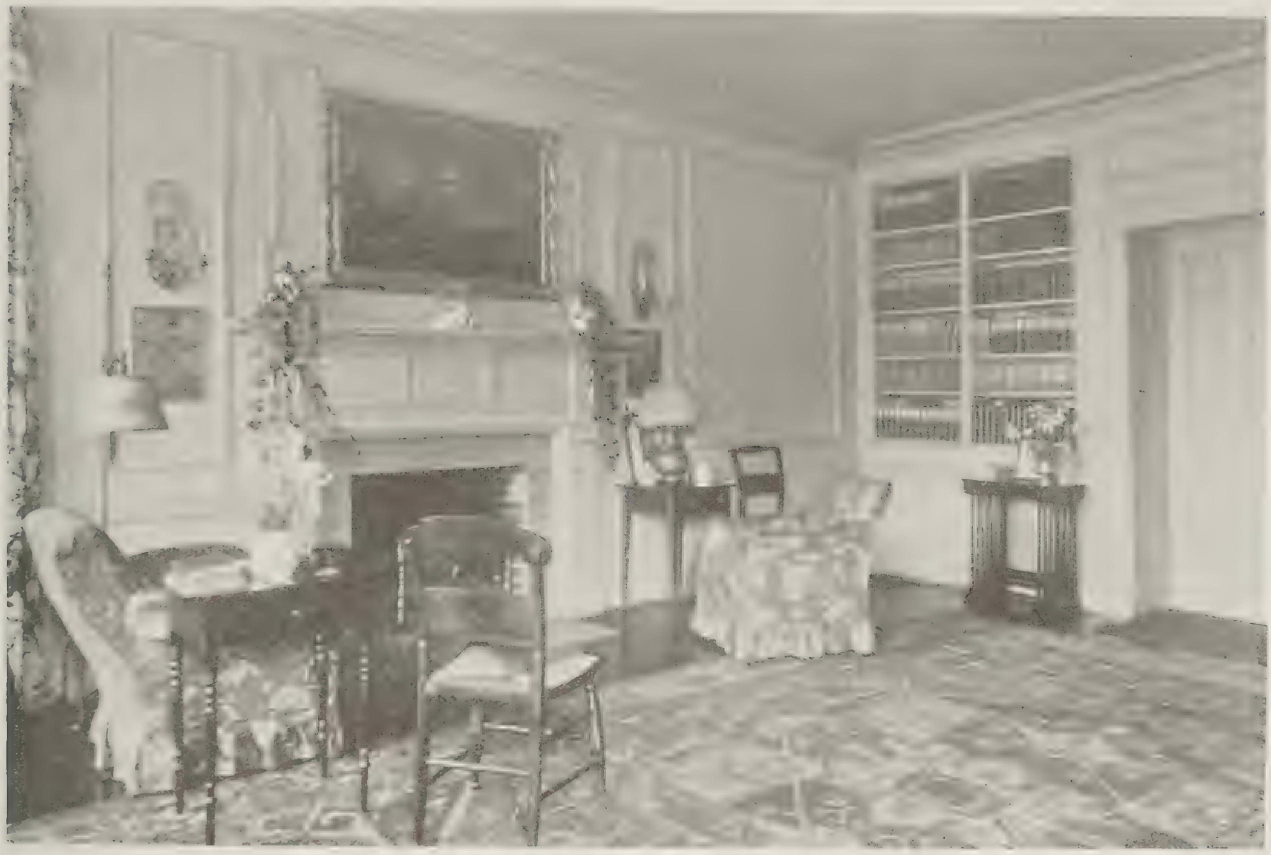


BASEMENT FLOOR PLAN

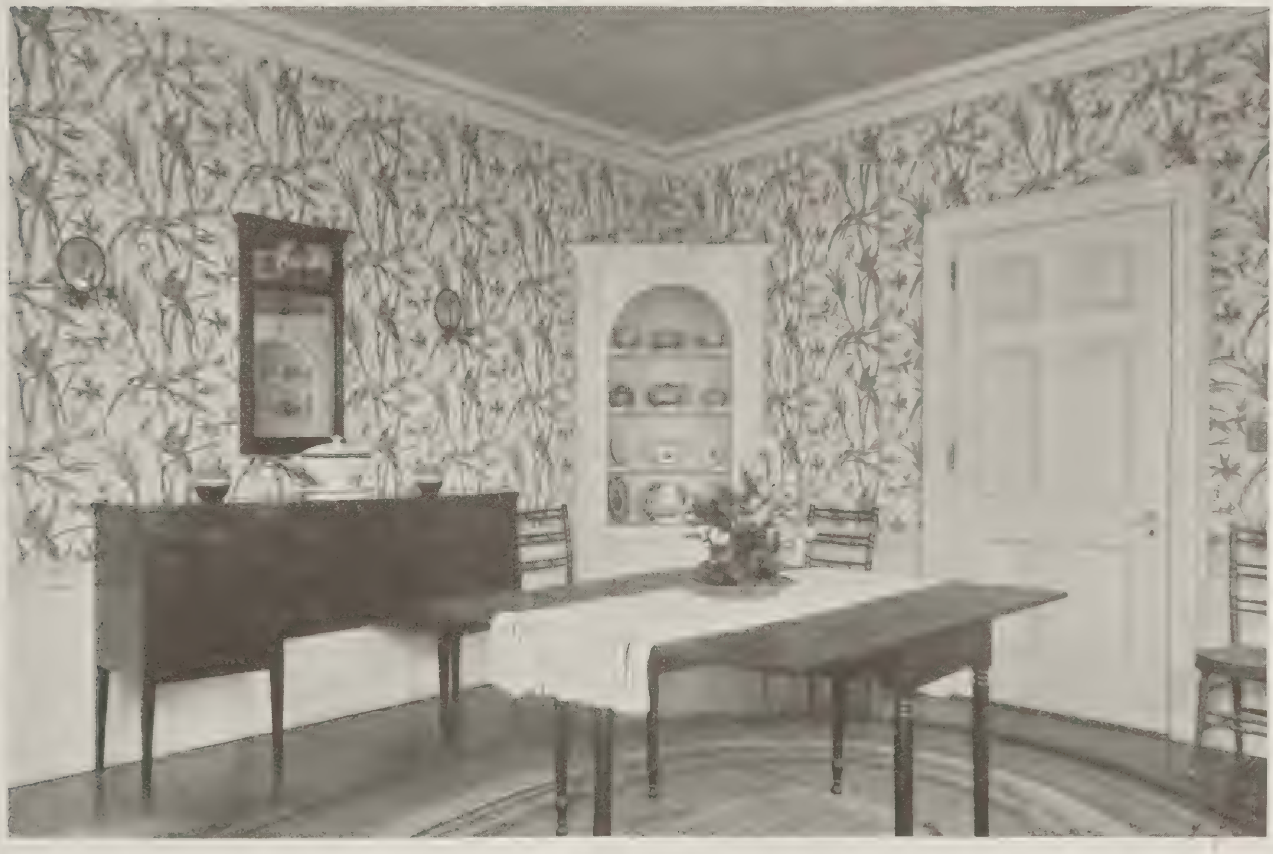


FIRST FLOOR PLAN

HOUSE OF HUNTER PERRY, ESQ., ATLANTA
HENTZ, REID & ADLER, ARCHITECTS



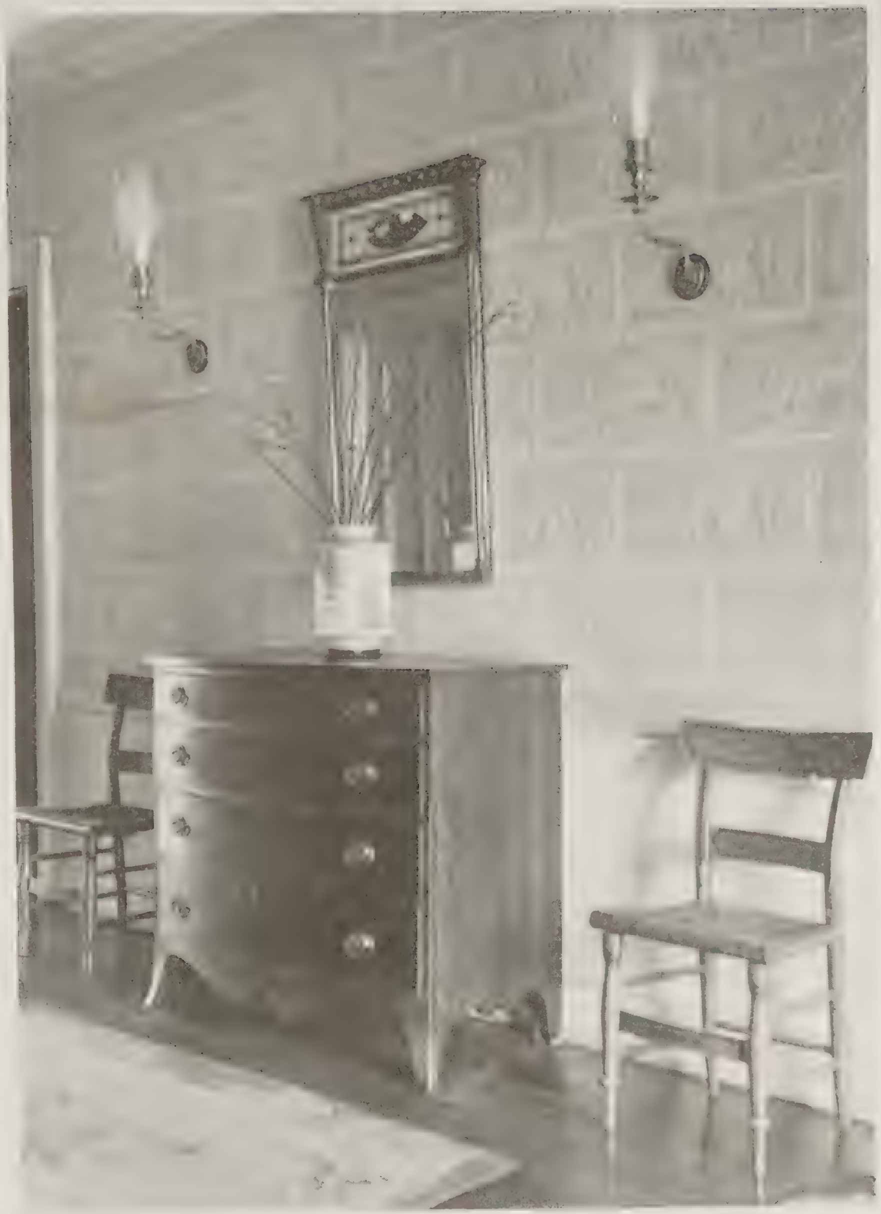
LIVING ROOM



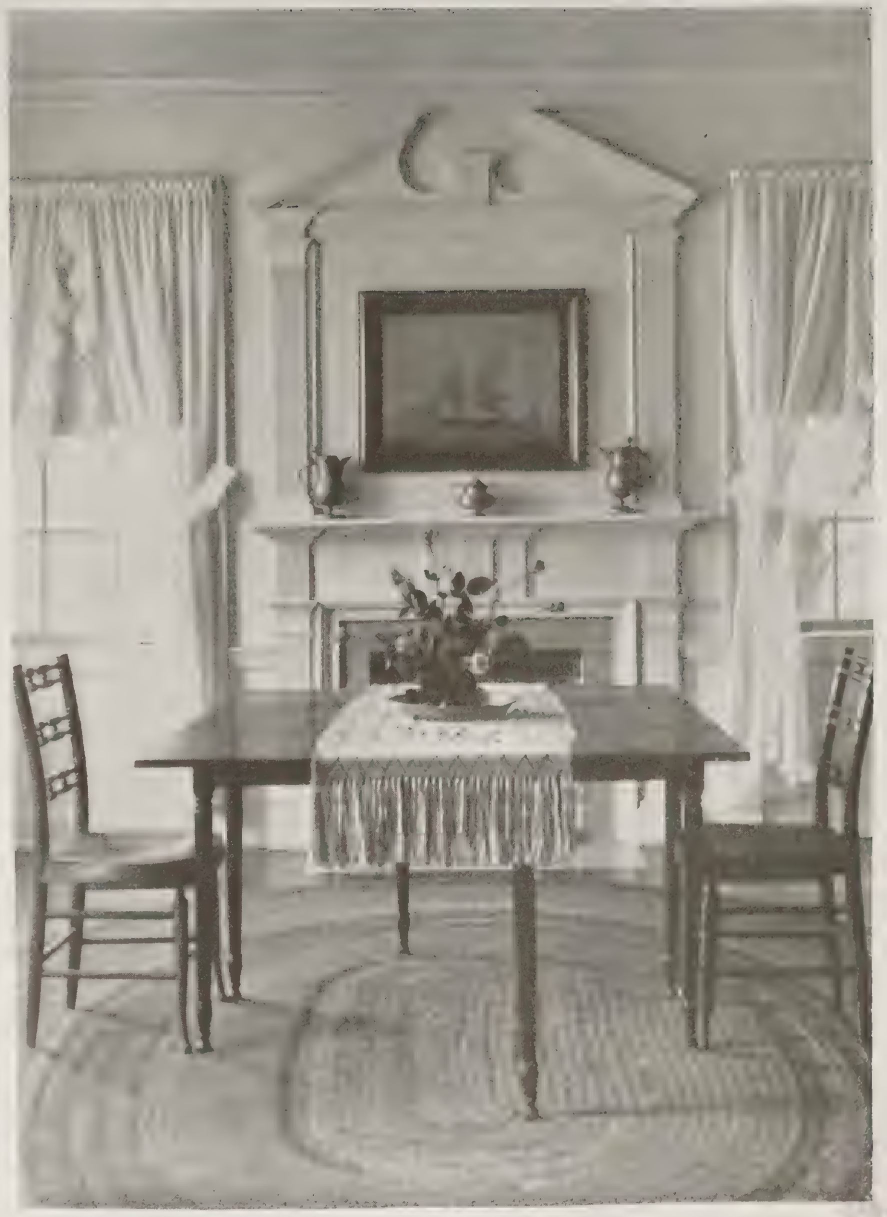
DINING ROOM

HOUSE OF HUNTER PERRY, ESQ., ATLANTA

HENTZ, REID & ADLER, ARCHITECTS



FURNITURE GROUP IN HALL



DINING ROOM MANTEL

HOUSE OF HUNTER PERRY, ESQ., ATLANTA
HENTZ, REID & ADLER, ARCHITECTS

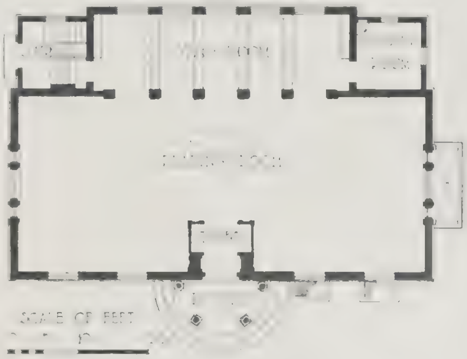
# The Public Library Building Plan II

*By* JOHN ADAMS LOWE

*Assistant Librarian, Brooklyn Public Library*

IN a previous article the writer ventured the opinion that some day a clever architect will design a library interior that will contain a genuine reading room. What efforts are librarians making toward this accomplishment? Are they fair in presenting reading rooms that are not honest? The excuse offered is that the rooms are not used for reading only but for storing books and distributing them, as well as for the display of current magazines on the tops of large tables. To him who knows books and understands the joy of reading at home in an atmosphere of books such a room offers little incentive to sit and browse. And to him whose only adventures into the contentment of reading have been in a public library the room says, "This is the way to do it." Is it? How do you read a book at home, at the studio or the club? Do you pull up the heaviest chair in the house to a heavy oak table 5 feet wide and 15 feet long, brush aside the omnipresent magazines that cover it and lay your book on the table and read? Do you face the light because the chair faces the window? And are you required to sit where you will bump elbows with someone flicking over the pages of a pictorial magazine and where every time you glance up from a page you stare straight into the eyes of a stranger?

Some brave architect will find ways of arranging window seats, and wall lounges, with lights conveniently located for reading. He may have small alcoves to encourage privacy. He will furnish his reading room with rugs, the long-wearing varieties which come in acceptable patterns; with draperies at the windows, not brocaded satin and velours, but cotton cloth, muslin, sun-fast fabrics which can be readily washed; with a variety of comfortable chairs, and floor lamps and table lamps with shades that function and focus the light when it is needed; and with tables, but tables which have use and meaning in reading. Discipline may be hard in such a room. Loafers of all grades of intelligence would have to be taught the value of the room and shown how to use it or to leave it. But in the meantime someone may be encouraged to read, to do more than turn magazine pages, may possibly get the library habit, and may even come into a realization of what a friend a book can be if one has half a chance to get acquainted with it.



First Floor Plan

**Goshen Library**

**Harvard brick has been used for the exterior walls, Vermont marble for trim, and slate for the roof. The reading room is paneled to the ceiling with oak. Floors of entrance vestibule are of tile, side entry of cement, and floors of reading room, stack room and reference alcove are covered with linoleum. Heating is from direct steam apparatus. Reading room seats 50, and provision has been made on metal stacks for 20,000 volumes. The position of the desk gives the single attendant view of the entrance and the entire floor. Basement contains a historical room, boiler room, toilets, and additional book stacks. Building contract was let in April, 1916; cost of structure without furnishings was $30,000 or 25 cents per cubic foot**

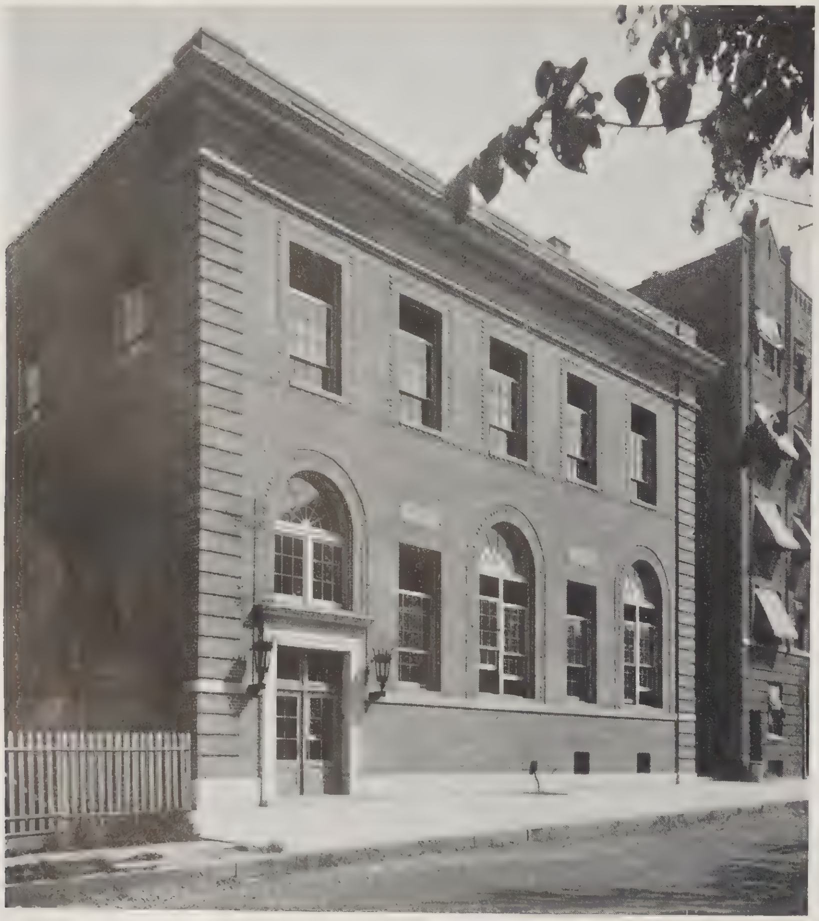
Goshen Library and Historical Society Building, Goshen, N. Y.
Huse Templeton Blanchard, Architect

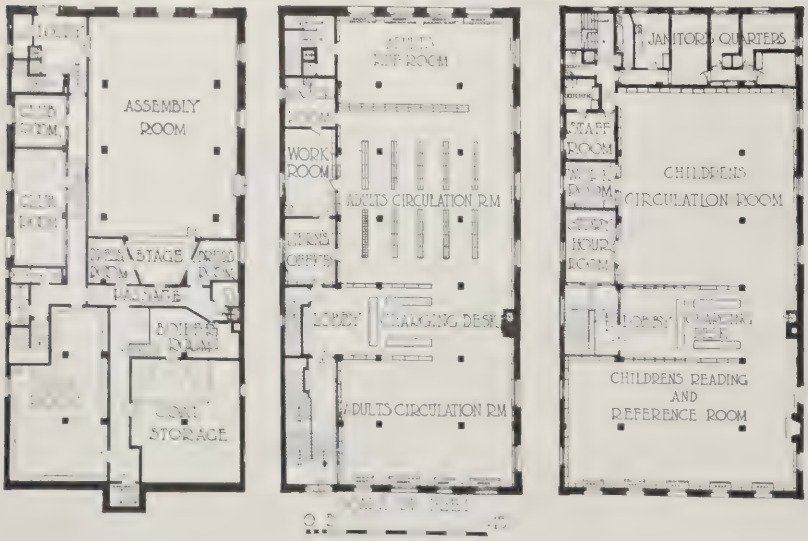
The weakness in the plans for most reference rooms, undoubtedly due to the same cause of inadequacy as the reading rooms, lies in the fact that they have to serve too many purposes. Some day our architect is going to plan a reference room which will be a most serious place—a place for study only, with small separate desks and a chair to each, and with a little shelf nearby for a few books chosen for the use of the student. Absolute silence and seclusion are the rule here. Books which a research worker would need and only those would be allowed on the shelves of this room. It would be necessary to have an attendant in charge at all times, and near her desk would be placed in the wall a vertical file for clippings and reference material and shelving for oversized books like atlases, city directories, encyclopedias and the latest bound copies of magazines—not long files of magazines. There must be provision here for storing and using maps. If there is no art department the picture collection will probably be located here, in large vertical file boxes.

A part of the building must be devoted entirely to the children. For a limited number of hours, usually from three to six o'clock in the afternoon, much of the activity of the library focuses in the children's room. Except in the smallest buildings, it will be necessary to have an attendant in this room during all the hours that it is open, and on this account and because all books for children, the card catalog, and the juvenile reference or school collection will be assembled here, it is not necessary to plan this room in conjunction with any rooms used by the adults.

An eastern or southeastern exposure is good for this purpose, for the force of the sun will be gone in the afternoon. Some librarians insist upon a western exposure in order that the room may be flooded with light when the children are present. The matter of light in this room is as important as that in the adult reading room and should be treated as carefully.

A children's room should be given convenient space on the main floor, preferably with a separate entrance from that used

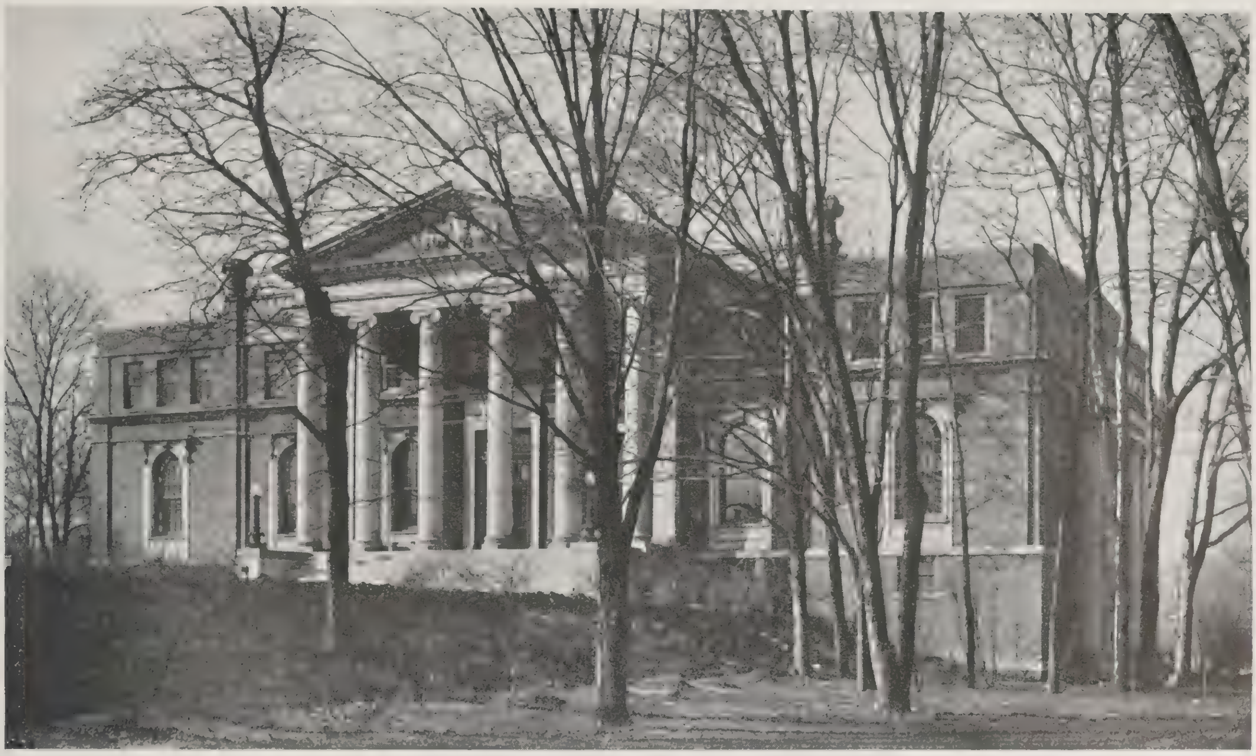




Basement Floor Plan First Floor Plan Second Floor Plan

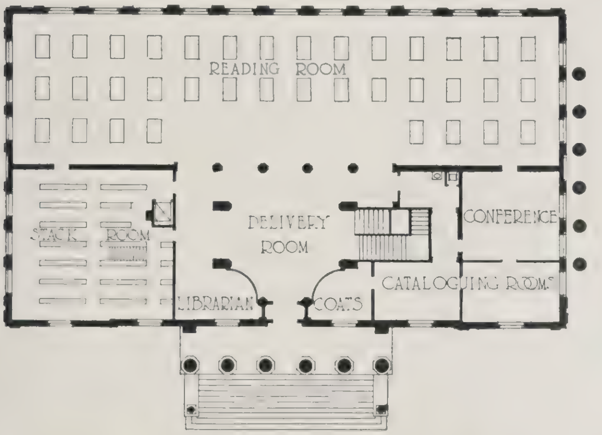
Fordham Branch Library Building, New York Public Library
McKim, Mead & White, Architects

Exterior walls are of red brick with trimming of limestone. Interior walls are plastered, and trim is of wood, stained. Heating is by hot water. There are at present about 25,000 volumes on the stacks, and the annual circulation is approximately 300,000. Main reading room seats 28; reference room, 22. Contract was let May 6, 1922, and the cost was $141,924.23 or 39½ cents per cubic foot, exclusive of furnishings or architects' fee.

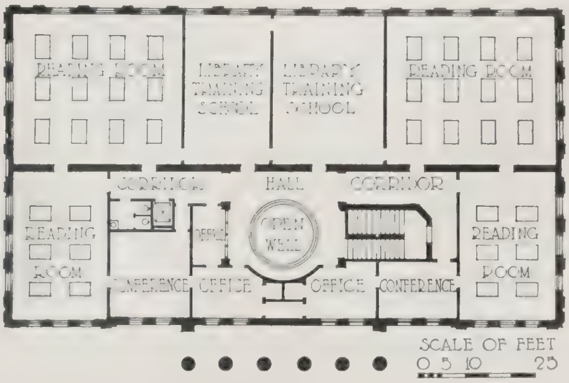


GENERAL EXTERIOR VIEW

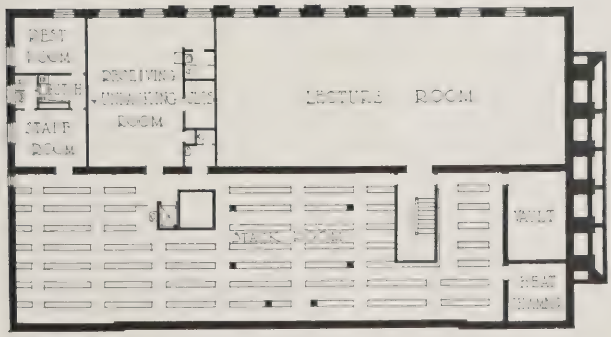
Brick and limestone are the materials used for the exterior. Heating is supplied from a central plant. The stacks are designed to accommodate approximately 200,000 volumes, and the reading rooms to seat about 200, abundantly adequate since the library is not open to the public. The contract was let October 10, 1917, and the cost without furnishings was approximately $135,000, or about 50 cents a cubic foot



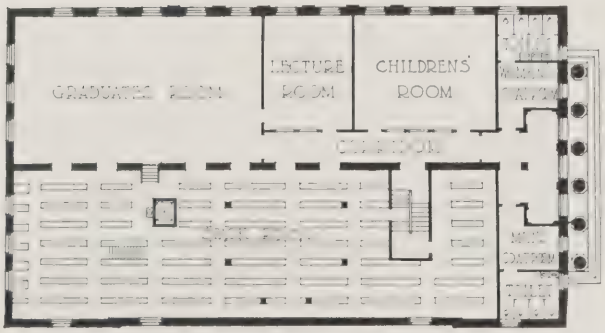
FIRST FLOOR PLAN



SECOND FLOOR PLAN



BASEMENT FLOOR PLAN



GROUND FLOOR PLAN

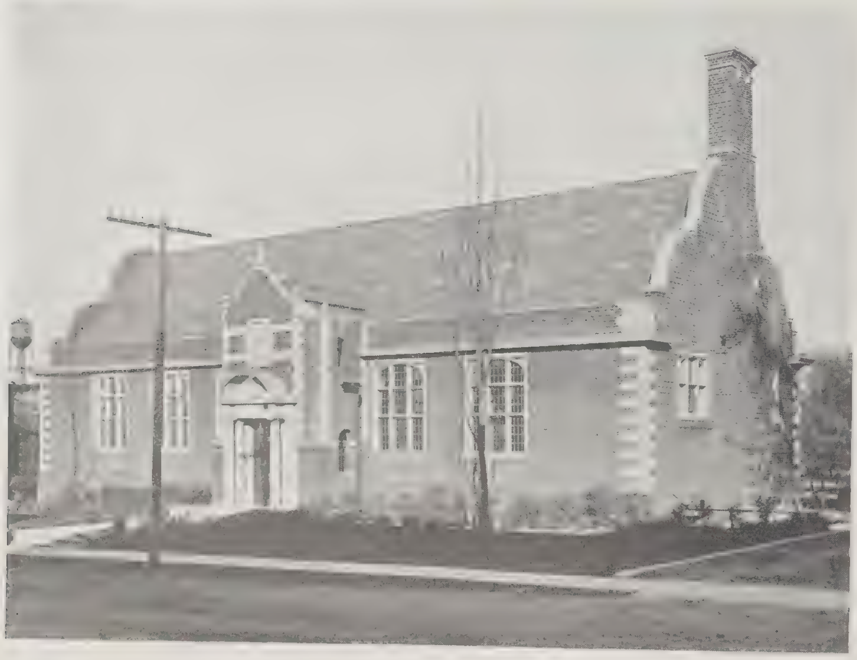
LIBRARY BUILDING, GEORGE PEABODY COLLEGE FOR TEACHERS, NASHVILLE, TENN.

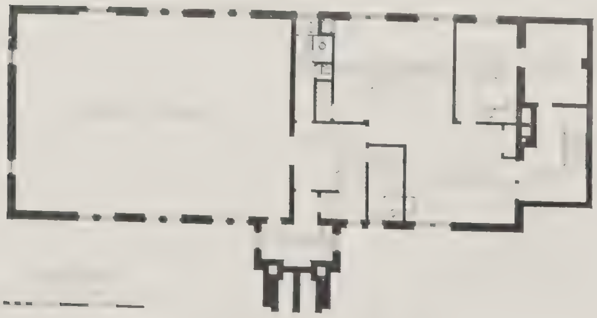
EDWARD L. TILTON, ARCHITECT; ALFRED MORTON GITHENS, ASSOCIATE by adults. This will, however, necessitate more than one attendant for the entire building if there are two entrances to be guarded. If adequate and proper space cannot be planned on the main floor it is infinitely better to put the children's room upstairs where ample space of the right kind can be provided. Young people climb stairs more readily than adults, but they require a careful planning of stairways, treads, risers, and railings. A children's room should not be put in the basement unless there is in the room sometime during the day plenty of direct sunshine, good ventilation, freedom from dampness, and ample heat in winter. A plan which fails to make adequate provision for the children at the outset is doomed to radical change and to failure if changes cannot be readily made.

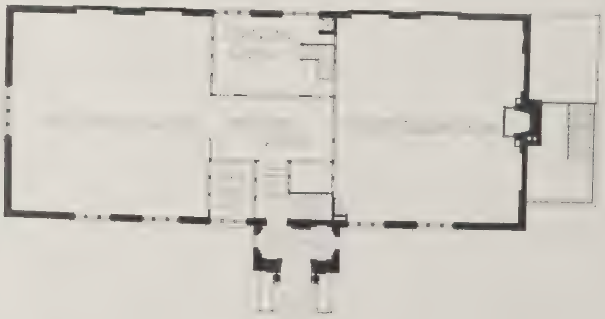
In this room a bulletin board and a few shelves behind glass doors for the exhibit of from 50 to 100 beautifully illustrated books are desirable features. A fireplace may be planned here. Story-hours are part of the activities. Provision may be made for gathering small groups around the children's librarian about the fireplace. If large groups are to meet frequently it will be well to plan a story-hour room adjoining the main room or easily accessible to it. The main auditorium is only a poor makeshift for such groups, since it is essential that story-teller and audience shall be in the closest comfortable proximity.

The librarian's office must be shut off from the rest of the building and be private. It is not necessary to place the office in a position in which the main room or any part of it shall be dependent upon it for supervision. An easterly exposure is generally not considered best for this room, as it is used almost entirely in the morning. It should contain ample space for a desk and table, a wash basin, coat closet, supply cupboard, and wall shelving. A workroom and a staff rest room will be added as the size of the staff warrants it. A lift from the unpacking room in the basement is a convenience, if feasible. If a room for the trustees to meet in is essential, the librarian's office may be made large enough for that purpose. Under ordinary circumstances it is not necessary to provide a trustees' room of large size or with sumptuous fittings, as their meetings are not frequent enough to warrant devoting money and space to a special meeting place. A toilet room and a lavatory for the use of the librarian and her staff must be provided, even in the smallest building, either here or in the basement.

It is customary to build the basement at least 5½ feet above the ground, and 10 feet in the clear. This will contain a hall connecting the main stairways with a side entrance; the auditorium and possibly class and club rooms adjoining; a storage room for books not in constant use; a workroom for unpacking books, sorting magazines, etc.; boiler room; fuel room; janitor's storage room for chairs, screens and double


General Exterior View

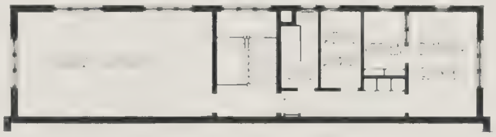

Basement Floor Plan


Ground Floor Plan

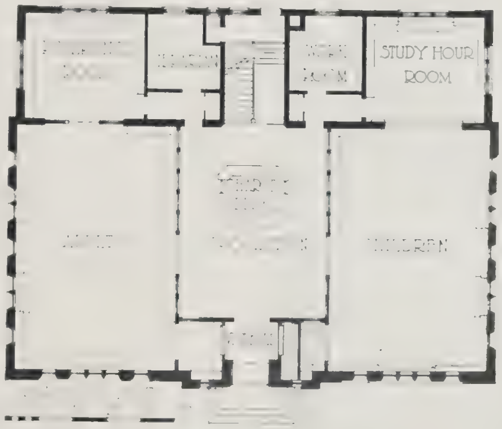
Mishawaka Library Building, Mishawaka, Ind.
A. F. Wickes, Architect

windows, and a janitor's workroom would be useful.

The basement must be absolutely dry, well lighted and readily heated. The janitor's entrance should be ample to provide additional entrance to the auditorium if it is placed here. All rooms should open into a hall, and entrance through other rooms should be avoided. It is well recognized that mildew is one of the most destructive enemies of books, and on this account provision for storing them in the basement is never planned for unless all traces of dampness are absent. In spite of this well known fact and in the face of everything that librarians could say, a donor has squandered a fortune in a small building recently and planned only a comparatively small space for books on the main floor where they would be accessible to the public and the librarian, but built an expensive iron stack, filling practically the entire basement in which the water seeped through the floor and which had inadequate windows to light the space.



Mezzanine Floor Plan



First Floor Plan

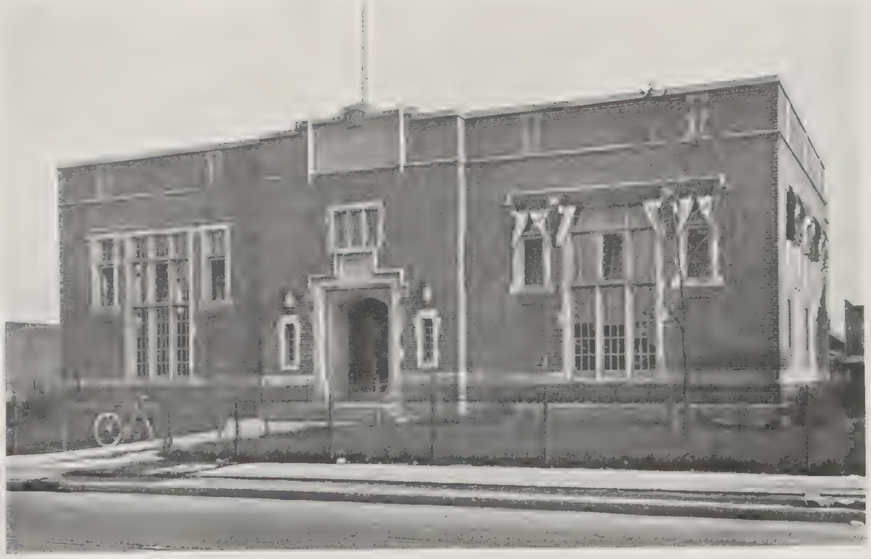
Failure to utilize the basement is a defect, but some objection is made to putting either a children's room or an auditorium there. Unless it is an unusually light and airy room, provision should by no means be made for children there. Library auditoriums are used by the public for general community purposes, and on this account must be planned with easy access and special entrances with the use of the public in mind. Future auditoriums may give the architect more interest than those which have been created simply to utilize unassigned space, for they will have to be adapted to purposes demanding essentially different treatment, motion picture performances, plays, concerts and lectures. Subdivision into club room space may add to the problem.

While good light is especially important in reading rooms and at the loan desk, it should be secured without domes or skylights. A skylight renders the room beneath it so hot in summer that it has to be so shaded that it is useless as a distributor of light. It is a dust trap, and leaks both in summer showers and winter snows. A net glass area, exclusive of sash and muntins, equal to one-fifth the area of the room, works fairly well for rooms not over 24 feet deep nor less than 12 feet high.

Essential as proper ventilation is, it is most unusual. Systems of forced ventilation are out of the question in a small building or in any building in the open country. It becomes necessary to depend entirely upon flues, windows and fireplaces, which are desirable not only for ventilation but for heat and decoration. Windows should be easily opened and should slide up and down and not swing on hinges or operate with transom rods or chain fastenings.

Perhaps the saddest and indeed the most frequent failure of otherwise well planned buildings is the lack of shelving for the books. It is necessary to think of the building as serving practically without major alterations for 20 years. It is easy to estimate the growth of the book collection at the present rate for that time to get the maximum capacity required. It is to be remembered, however, that there will be constant withdrawals as well as additions, and that it is the present policy of librarians to weed out dead books so rapidly that in many cases the collection remains fairly constant.

If it is planned to store the books most used around the walls of the reading rooms, to determine the shelving capacity, count on eight books to the running foot. One-third of each shelf should remain vacant to avoid constant shifting of books when new ones are added. The cases are usually built seven shelves high, having a book capacity



Henry R. Schoolcraft Branch Building, Detroit Public Library
Donaldson & Meier, Architects

of 56 volumes to the foot for wall shelving, and 112 volumes a foot for the double-faced cases. This is practically full capacity, as over-sized books must be taken into consideration. In small buildings all books should be placed on wall shelves. Stacks should not be installed in buildings containing book collections of less than 10,000 volumes. If it is necessary to install steel stacks and it is probable that the book collection will grow sufficiently to warrant a second tier of stacks, it is of the utmost importance that the foundations and supports of the first tier be strong enough to carry the load of the second tier, and also that ample space be left between the top shelves of the first tier and the ceiling to place the second tier. Many buildings have been built in which it was necessary to take out the first tiers and strengthen foundations and supports before the second tiers could be put in, and it is true, incredible though it seems, that several buildings have been built which allowed only 4 or 5 feet for the second tier. Theoretically, stacks should be used only for storage. If the public must have access to them it will be necessary to allow 4 to 5 feet in the clear between cases for proper access.

Interior, Montague Library, Rockford, Ill.

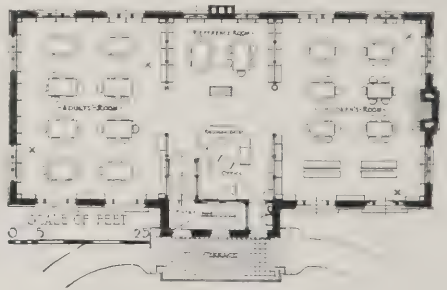
Interior, Boys' and Girls' House, Toronto Public Library

This special children's library is housed in a city house of no architectural pretension, but carefully arranged to meet its special purpose. Benches are used for seats and one room for very young readers has glass topped tables which display picture books at a glance

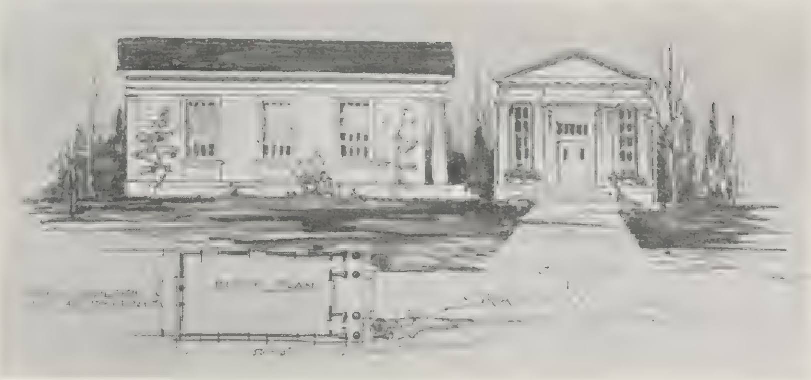
Enough has been said about the number of persons constituting the staff to show that this has an important bearing on the plan. In the smallest buildings there will undoubtedly be only one attendant. Experience seems to show that it is not wise to expect one attendant to administer a library with any degree of satisfaction in a building having a main floor area of more than 3,600 square feet, a total annual circulation of 50,000 volumes, and a book collection of 10,000 volumes. This will, however, depend to a large extent on the type of the neighborhood, its interest in reading, its law-abiding and civic spirit, and also whether borrowers are likely to come in in crowds within a brief period of time. Theft and mutilation of books are two evils which necessitate supervision, and it is as necessary to provide against such possibilities among adults as among children. In large libraries more resources and large staffs will make divisions in the work, and these will call for separate units in the plan.

Montague Branch Library Building, Rockford, Ill.
Chester E. Wolfley, Architect

This library was planned for Americanization work as well as its library functions. The well lighted assembly room, seating 200, is fitted with portable platform and a stereopticon and motion picture machine. Building, steel, concrete and brick. Trim, quarter-sawn oak; floor coverings, linoleum. Capacity, 9,000 volumes. Library completed during 1923; cost without equipment, $27,663.36 or 30 cents per cubic foot.



First Floor Plan



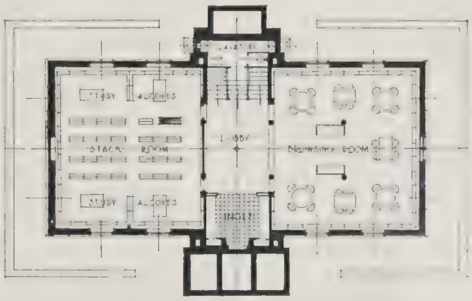
Design for Small Branch Library, Birmingham, Ala.
Edward L. Tilton, Architect

It is true that there probably never will be enough staff members to administer each part of the work satisfactorily, but a complete understanding as to the possible number available will help decidedly in making the building plan.

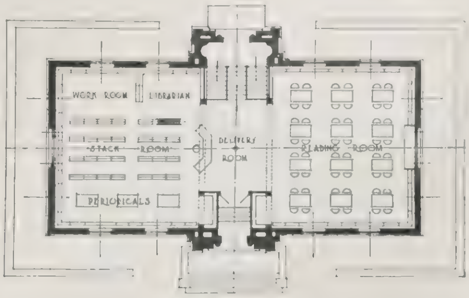
The style of architecture has to be left to the architect, although too often his choice is limited by funds and by the community and its architecture. If the building answers the purpose for which it was built, if its masses are grouped in an interesting and pleasing manner, if all its parts are well proportioned, not only with regard to themselves, but with regard to the surroundings of the building, and if the motifs are selected with good taste, then the complete structure will be a true expression of architecture. The public is beginning to recognize false notes in design. It resents use of stock plans. It welcomes individuality and the element of surprise when honestly executed.

Again, the neighborhood and funds available determine primarily the material of which the building is to be built. In more or less congested districts of cities any slow-burning material is acceptable provided that it harmonizes with its surroundings, makes the right appeal to the passerby, and is adaptable to additions and expansion. In small cities and towns wood is acceptable, wherever fireproof construction is not required for dwelling houses. It is enduring enough to outlast its adaptability to its use. It lends itself readily to treatment producing dignity, refinement and charm. The fire hazards

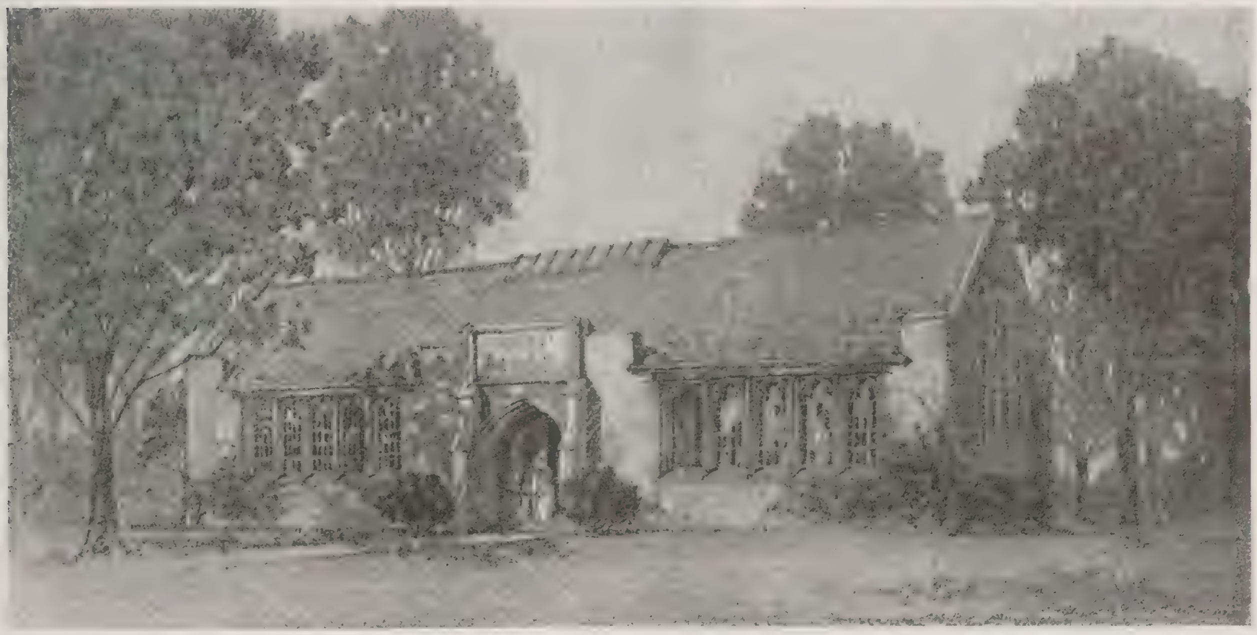
This building is to be developed in brick and limestone; interior walls plastered; finish of oak. Heating from a central plant. About 25,000 volumes will be provided for, and provision is made for several "study alcoves" for the convenience of faculty and students. The structure was planned to cost $40,000 or 50 cents per cubic foot



Basement Floor Plan



First Floor Plan

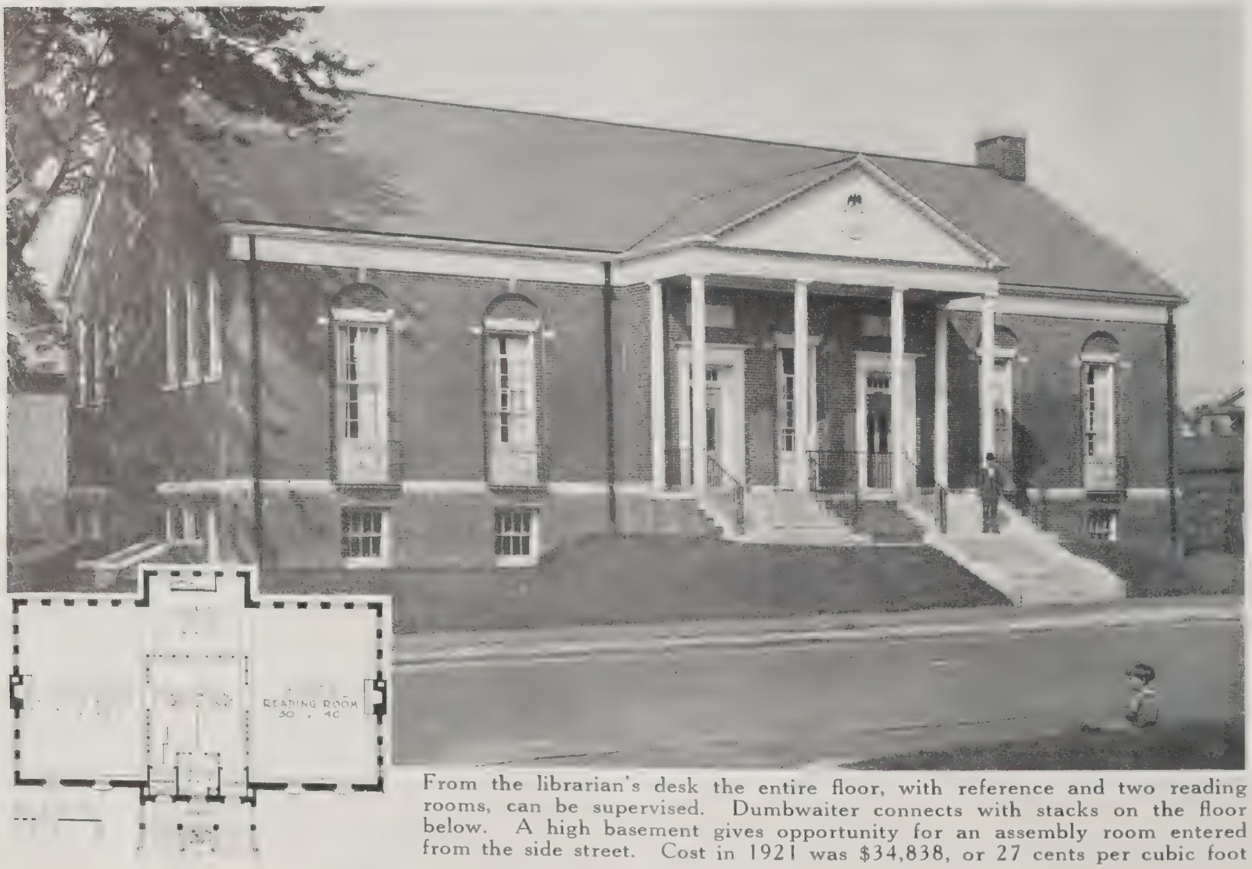


Design for Small Library Building, Murphysboro, Tenn.
Edward L. Tilton, Architect

on libraries depend less upon general construction than on mechanical equipment. The ordinary small city or town library does not possess book treasures of sufficient value to warrant the expense of fireproof construction. The usual building is low enough to obviate the danger of becoming a firetrap. For these reasons people are asking for wood and are insisting that Greek temples and Roman palaces executed in cheap brick and poorly mixed concrete, ornamented with ill-shaped, crudely painted iron, have no place in comparison with simple, charming buildings frankly and honestly built of wood.

Interior of West Branch Library Building, Bridgeport, Conn.
Leonard Asheim, Architect

And so we feel that there is enough of interest and challenge in planning a library building, even that for the smallest town. There are two standards by which the success of a library building as an acceptable example of architecture shall be judged, neither of which alone is sufficient. First, it must be practical, and fulfill the purpose for which it was designed—to make knowledge available through print, to teach the use of books and to foster a love of good reading; and second, it must furnish inspiration to the passerby and enhance the beauty of its surroundings. Certain people may regard as art a beautiful building which is poorly planned; but no matter how well it is planned, if it is an ugly, gloomy structure, no one would think of calling it an example of architecture. Scattered over the country are many well planned library buildings which are acceptable examples of architecture, and there is everywhere promise that the future will produce buildings more practical and more beautiful because of the serious attention now given to libraries by masters of the art of building beautifully. And, too, there is hope of a more glorious day in the fact that librarians as well as architects and patrons are coming to have confidence in one another and to have respect for each other's ideals and purposes. It is not enough that a building *serves*. It must *inspire*.



From the librarian's desk the entire floor, with reference and two reading rooms, can be supervised. Dumbwaiter connects with stacks on the floor below. A high basement gives opportunity for an assembly room entered from the side street. Cost in 1921 was $34,838, or 27 cents per cubic foot

Newfield Branch Library Building, Bridgeport, Conn.
Leonard Asheim, Architect

# The Practice of Architecture: An Economic View

By HOWELL TAYLOR

TO the architect who realizes that his practice is a public trust, of which he is only the administrator, not only will come greater professional satisfaction but a larger measure of success. The acceptance of this point of view carries with it the development of a broadened perspective on his relationships with his assistants and the many commercial agencies of construction fields. It affords him better opportunities for establishing a much needed appreciation among laymen of the value of able professional service than are possible with a practitioner who has kept himself carefully insulated with more conservative beliefs.

This premise is not intended to take issue in any way with the fine old traditions of architecture—there is not a worth-while tradition which will conflict with the most liberal point of view. It does not depart from the premise which states that architecture is a fine art—the most far-reaching and practical of all the arts, with its argument carried into the parcel of human activity, but it may be construed as a premise which suggests a broader and more practical understanding of its machinery. Conversely, it challenges the administration of the trust and implies that the profession is 30 years behind the times in its appreciation of the principles of modern business economy and their indissoluble connection with the structure of architectural practice.

It is a plea for the sort of professional liberalism which comes from a scientific study of *all* factors entering into the practice of architecture—consideration not only of an architect's responsibility to sound construction, beautifully designed, but to the human elements involved as well. The day will soon pass when the architect can ignore so important a part of his trust as the latter, for in so doing he tacitly admits his disinterest in the tools he must use in executing his ideas. His mental conception of a building may be complete; he may have put it on paper himself—and therein lies the basis for recognizing that architecture is a fine art—but when execution is started, in even so simple a manufacturing operation as employing assistants for making drawings from which to build, an entirely new set of principles is involved and the architect steps across the line which separates artist from manufacturing executive. He no longer can consider himself in the same boat with the painters and sculptors unless he is willing to hang his designs on his office walls and forget that architects exist for the purpose of constructing buildings. In other words, he is confronted with problems of modern business economy, for he must concern himself with a scientific study of co-operative organization and make an analysis of every factor entering into the numerous and varied details of human welfare.

The term "modern business economy" is used advisedly, and does not suggest commercialism in any sense. It refers rather to the ideas which sound but liberal thinking of the business world has come to recognize through scientific study and analysis as necessary of acceptance for right social progress. Its principles have developed from the sort of thinking done by the liberal business man whom Edward A. Filene describes as "the opposite of the reactionary, the sort of business man who faces fresh problems with a fresh mind, who is more interested in creating a better order of things than in defending the existing order of things, who realizes that a private business is a public trust, and who has greater reverence for scientific method than for the traditions and majority opinion of his class." The platform of modern business economy is stated clearly by John D. Rockefeller, Jr.:

"In the light of the present, every thoughtful man must concede that the purpose of industry is quite as much the achievement of social well-being as the accumulation of wealth.

"The soundest industrial policy is that which has constantly in mind the welfare of employes as well as the making of profits, and which, when human considerations demand it, subordinates profits to welfare. Industrial relations are essentially human relations.

"It is therefore the duty of everyone entrusted with industrial leadership to do all in his power to improve the conditions under which men work and live."

It is generally admitted in business circles that the construction industry is the last great industry remaining untouched by the changes in modern economic thinking, and that its failure to progress lies at the door of bad leadership. The most cursory analysis of other industries, now freeing themselves from labor troubles, proves that they are those in which the principles of co-operative organization have been introduced. Their leaders have realized that back of every material element stands some human effort which must be reckoned with. This has not been done in construction fields, and in consequence the whole industry is full of unrest and dissatisfaction, unfair practice and low morale.

Leadership in the construction industry is the architect's natural function. From him should start the inspiration which makes a building a success or a failure. The fact that construction and engineering corporations are assuming so important a place in building in competition with the service an architect is supposedly able to render, would point unmistakably to some shortcoming in the architect. Either he has flagrantly misused his trust or he is hiding his light under a bushel. The fact remains, however, that he can never assume his place as leader until he is willing to assume all its responsibilities and all that its responsibilities involve.

"Group provincialism" is the only term which characterizes the state of mind back of the situation. It is epitomized rather poignantly in the statement of a recent critic of these articles when he decries the use of a carefully developed plan of organization for an architect's office. After describing satirically a diagrammatic organization chart, he says, "All very businesslike and efficient, no doubt. Commercial, yes, but this is a commercial age. At least, so some blatantly insist and many accept. Personally we don't think it half as commercial as it seems to be. We believe that there is a general appreciation that architecture is one of the fine arts and not a business, and we believe that that appreciation is growing, and we believe that in course of time there will be a demand that the architect become an architect in fact instead of in name, and that he do his work himself, and that such things as chief designers and office managers and liaison assistants will have no more place in an architect's office than they have in a sculptor's or artist's studio. If an architect can't do his own designing and his own thinking, he should give up all pretense of being a member of a profession and go frankly into business where he belongs."*

The commercialism of modern life, which confronts us so insistently, offends any architect or artist or careful analyst as seriously as it offends our critic, but mere raillery does not help matters. It only confuses the issue and makes clear thinking more difficult. The question does not involve dragging the ends of architecture in the mire of fanatical reform, nor the despoiling of her noble traditions. It is one rather of expediency of method to accomplish those ends. Is it not possible for members of a profession which requires the education and breadth of viewpoint demanded in architecture to retain a set of ideals but change the method of practicing them if the times demand? It is unfortunate indeed that some of our ablest architects continue to resist the wheels of progress and sigh for classic and mediæval conditions in no uncertain terms, little realizing that the world, which they want to influence and lead, is branding their aloofness as silly fogeyism.

In assuming a more liberal point of view toward the business and economic aspects of the profession, the architect is not sacrificing his art. Architecture will weather the storms of whatever commercial influence is placed upon it. It cannot be otherwise. Its only limitations are those imposed by the men who make it their business to fulfill its demands. It can never be more nor less than one of the fine arts. If commercialism seems today to be asking for the greatest consideration in the machinery of its practice, it is the duty of architects to lend their best influence toward bringing about a return to more intellectual interests. Mere "stand-off-ishness" never accomplishes anything, and the elements of professional snobbery that have characterized the profession are reacting against its members as nothing else can.

Another critic of modern thinking in architecture says: "Utilitarian ends are good in their place, but they must not in building be confused with the ends of architecture. In purely utilitarian building the idea of what we call practical utility governs. In architecture all utilities are controlled by the sense of beauty, as the architect conceives beauty."*

From what need does architecture spring if it is not that of practical utility? What started architecture if not the need of covering one's head and the protection of one's household gods? In taking issue with professional liberalism is it not well to note whether or not the issue is made with the fiber of public taste, its natural trend of human activity and the forces which promote it?

If we accept a definition of architecture which says that practical utility must be the first limiting factor in design, and that the task of the designer is to beautify what must exist, it is not unreasonable to look forward to a time in the development of economic and intellectual conditions when the demands of practical utility will have been so simplified that the idea of beauty will seem to dominate. Such a development can only be incidental, however, and the fact remains that architecture exists primarily by reason of an economic demand. It is the architect's duty to see that this demand is met with a crisp and living freshness of good design which, at least in the centuries to follow, will mark us as students rather than craftsmen whose progress did not consist merely in evolution out of one set of traditions into another. That the evolutionary traditional trend may not always be a good one in design is seen in the Victorian period of the past century—a development, for America at least, which has meant an encumbrance of architectural atrocities, whose influence is likely to take many generations to overcome.

Architects are making rapid progress in the wise administration of the design and construction elements of their trust, however. Most critics agree that the quality of design is improving. The individuality and carefully studied quality of much of the recent work are presented in every issue of the architectural press, and the widespread interest in better design is giving able practitioners desirable advantages, but the percentage of architect-designed-and-supervised buildings is too small. There must be something fundamentally wrong with a profession which cannot meet the competition offered any more successfully than architects are meeting it, for it is assumed that the architect is the logical individual under whose direction the larger percentage of buildings should be constructed. Something has happened in the last century or two which has caused the public to push the

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*Egerton Swartwout in *The American Architect.*

*Prof. Charles H. Moore in *The Architectural Record.*

architect into a dark and secluded corner from which he can be gingerly removed only on special occasions. In general he has not the confidence of the average user of his service because he has not kept pace with advancing thought, thus enabling himself to hold his position as a leader in the community. He has let his concept of professional duty dwell too largely on its artistic elements, and has attempted to maintain a mediæval aspect of the profession. He has not recognized its economic significance nor been willing to share in the labor and thought required to establish conditions which will relieve the serious situation in the construction field.

Failure to get into the band wagon of modern thinking also reflects itself in his method of selling professional service as well. In the business world economic analysis proved several years ago the futility of getting business the way architects are now attempting to get it, with the result that almost incredible commercial expansion during the last 25 years has taken place. Architects are helping to "prostitute the ethics of the profession by using the back door method of getting commissions," namely, personal friendships, fee-cutting, wire-pulling, etc. A more direct selling policy on a basis of profit-to-client will stabilize the demand for architectural service.

The trouble is deep-seated. It is quite easy to see that only gradual stagnation over a long period of time would make possible a state of thought which so consistently rejects even the most conservative liberalism. Many critics will declare that it is not so, and it is to be expected that this would be the case, for architects as a class have little intimate contact with activities outside the construction field. Their shortcomings are catered to by manufacturers because in general their relation to the manufacturers is that of buyer rather than seller. Architects do not have occasion to rub elbows with the give-and-take business world, and therefore never have been compelled to subject themselves to the rigorous self-examination which business men have to make in order to keep their heads above water. Few architects have had any business experience or training. They have grown up in the offices of other architects, and it is not unreasonable to find that there is a woeful lack of appreciation of the elements of business economy on this account. They have been slowly set aside—their influence has been less felt in broader community life, and those who have been more alert to economic needs have stepped in, while the construction industry still retains its cut-throat practices and mediæval thinking.

There are notable exceptions, of course, and it is a pleasure to find a growing interest and appreciation in the executive nature of the architect's status. Neither delving into promotional activity nor the commercializing of design—both of which tendencies are likely to lead to the building up of larger office staffs—can be confused, however, with the architect's responsibility to give sincere attention to the economic elements of his practice.

With the unusual development of scientific and engineering knowledge during the last 30 years the business world has begun to realize the advantages of coöperative effort. Competitors stopped regarding each other as enemies and began to see that the other fellow's smart methods might be valuable. It is the spirit of the modern business world to accept and make practical use of results obtained by thoughtful men who have an intimate knowledge of the subject in question. Such a system makes for specialization, of course, but it also establishes a greater fund of accurate knowledge and brings about more consistent growth. Business men have realized that what helps one, helps all. If a group of merchants in a small city get together to advertise the community as a good place to buy, it has been proved by test that the percentage increase of sales for all will be the same, although the differences in volume will vary.

Since the great ages of design, building practice has been reduced to a science, and modern methods of construction have had to be accepted in order to practice architecture today. We are doing perhaps two thousand times as much building in a year as was done less than a century ago, and our whole problem of living is so much more complex that comparisons with any preceding periods or conditions are impossible. Today the machinery of building practice has grown to enormous proportions. Its functions are more complex than those of the most extensive manufacturing business, but they are so loosely connected that definite forms of organization are impossible. This is undoubtedly one of the principal reasons why the construction industry has been so tardy in accepting a modern economic point of view—and why so few leaders have been developed. Architects have kept themselves uninformed on the methods and value of modern organization by reason of their beliefs that nothing "commercial" must be allowed to creep into the profession. On account of its very looseness, however, does the industry need most carefully trained executives at its head—men who have a concept of architecture and the labor which produces it which lets them recognize that their activities can only have a survival value when they make a worthwhile contribution to civilization or to the advancement of human thinking.

What is the remedy? Where can an architect begin if he would convince himself of the value of coöperative organization and study the application of its principles? Its point of view is not a cloak that can be put on and taken off as occasion demands. It must come as mental conviction. Charles M. Schwab says: "Men are keen judges of their employers. You cannot make workmen think you are interested in them unless you really are. They realize at once whether your interest is real or assumed. The only man who gets the loyalty of his employes is he who deals in fairness with them."

It is impossible to say what steps will be logical in applying the principles of coöperative organization to the construction industry. To do so would be like asking a youngster in the fifth grade to solve a problem in calculus. He must learn the fundamentals of mathematics before he can go to more complex problems.

The coöperation testing laboratory for the architect is undoubtedly to be found in his own office, where the value of coöperation principles must be recognized before he can influence the trades and larger units outside. Its first step is the assumption of a policy of confidence and co-partnership in joint endeavor toward any member of the staff, however insignificant he may be. In describing the methods of Andrew Carnegie, Mr. Schwab has again struck a keynote:

"Mr. Carnegie was always one to take you by the hand and encourage and approve. It was the rarest thing in the world to hear him criticize the actions of others, especially in a business sense. I wonder if you reflect how you yourselves—how every other man—responds with his best efforts under such conditions? In my wide association in life, meeting with many and great men in various parts of the world, I have yet to find the man, however great or exalted his station, who did not do better work and put forth greater effort under a spirit of approval than he would ever do under a spirit of criticism. Now Mr. Carnegie understood this great thing early in life, and it was this fine philosophy, which he practiced always, that made him a great commercial success."

To any intelligent man paternalism of any sort by his employer is as irksome as complete disinterest. Men want sincere encouragement. They want to know that their efforts are an important part of the organization in which they work, and every man, no matter how unimportant may be his duties, can be made to feel the necessity of his service with a little care on the part of his superior. It should never be forgotten that every job worth hiring a man to do is worth teaching him how to do well.

Destructive criticism stifles initiative as no other influence can. I have seen the morale of an office sink to the lowest degree under dictatorial, unreasonable management. If men are subjected to constant catechization and criticism, which is an affront to their intelligence, on the one hand, and are expected to exercise independent judgment and responsibility on the other, as are the majority of experienced draftsmen, superintendents, and contractors, what is to be expected but trouble? A good average man only wants a chance to work harmoniously with his neighbors.

Why drive draftsmen into business for themselves? They only offer additional competition to architects already established. Why not recognize the fact that the average good man can be developed into an asset to any practice? Under present conditions the larger organization, which can handle all four departments of architectural practice, can turn out far better work. Each man has his potential group of clients, and he should be encouraged in establishing a contact with them for his employer.

An employer or executive should not begrudge credit when a piece of work is well done. The man will thrive under encouragement and deserved praise. I have sat in conference with a principal of a firm and a client, and have heard the principal say that he designed this or that feature of the work when he knew I had done it, and perhaps he had never seen the design in question until ten minutes before the conference. I only ask that he say "we—the office—have done it." The "we" spirit in an office is a wonderful thing. If it gets into organization it can be fostered and introduced into construction groups. There is nothing like it to bring in results. If a man feels that he is a part of a splendid organization which is accomplishing big things and he is encouraged, the petty annoyances are going to take a much less important place in his mind, providing he is fairly treated in the matter of wages. It breeds initiative and good work. It makes boosters of the men instead of malcontents.

It is quite easy to watch the method of a successful construction superintendent. He may not have studied the psychology of the individual workman's mind, but he knows there is nothing like encouragement—a spirit of "we'll-work-this-out-together" in every phase of the work, to keep things running smoothly. It too often happens that the arrival of the architect on the job is the signal for disruption in the machinery of coördinated effort.

This is a transitional period, the end of which we cannot see. Modern public demands may not be what the architect likes; he may prefer another sort of world, but every insistent public demand is incidental to some important development. Idealists find it hard to admit that our twentieth century life seems to have commercialism as its fundamental principle, but ignoring it will merely complicate its problems which must be solved before a return is made to conditions where intellectual interests are in the ascendency. Not a few careful thinkers believe that commercialism is beginning to drive itself to the wall and is being defeated at its own game, and men are finding that "the one route to happiness through property or government is over the broad and open highway of service." (W. G. Sibley.)

As in every other great activity, modern methods of transportation and the far-reaching scientific discoveries of the past 50 years have brought about radical changes in architecture, the adjustments to which are not yet complete. As members of a profession which has idealism enough to retain its deep appreciation of æsthetics, it is to be hoped that architects, at the same time, have the vision to see the scientific necessity of turning their attention to modern economic thinking in the highest sense in order to help ride out the storms of our period.

# Interiors of Tudor Inspiration

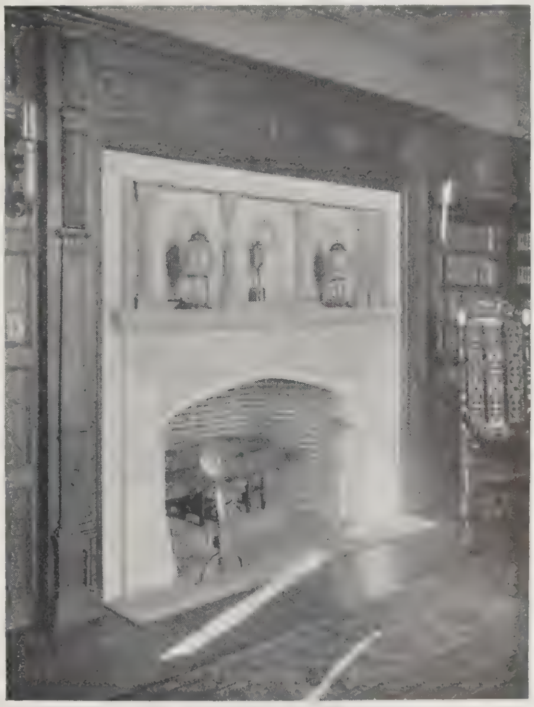
## THE HOUSE OF ROBERT LAW, JR., ESQ., PORTCHESTER, N. Y.

DWIGHT JAMES BAUM, ARCHITECT

IN planning this large country house it was necessary to adapt the plan of a house such as might have been built in sixteenth or seventeenth century England to wholly different conditions. Interesting as it is, the climate of our Atlantic seaboard states renders the planning of a house in quadrangle fashion rarely practicable, and use must generally be made of a plan which is more compact. Matters of design call for adaptation rather than compromise, and the Tudor character which is so strong in this house is the result of consistent use of traditional motifs and of wise use of considerable old material which the architect was able to secure.

In the entrance hall there is indicated the architectural character of the house as a whole. Here the floors are of Italian convent siena marble, and the walls are faced with travertine which has been given a honed finish. The heavy timbers of the ceiling and the wood of doors, paneling, stairway and organ console are of English oak which has been cut more than 70 years, and the carving has been done by local craftsmen. The design of the carving suggests what would be found in any old English house built during the late Tudor or the early Jacobean period, and shows a mingling of Gothic and Renaissance motifs. One interesting detail of this stately hall is the arrangement of the great organ with its console standing upon the floor of the hall, while its pipes are placed high on the stair walls. Another detail of interest is the use of stained and painted glass in certain windows of the large group upon the stair landing.

For the living room rough textured plaster, in which the color was mixed, has been used for the walls and for the ceiling between the timbers which are original seventeenth century material brought from England. An old Norman chimneypiece of stone surrounds the fireplace, the hearth being raised a few inches above the floor of the room. The jambs of the windows and doors are of stone, and the lunettes above certain doors are of modeled plaster. Much of the furniture in this room is antique, and use is also made of careful reproductions. For draperies there was imported from England a crewel embroidery, the ground being cream and the colors old blue, old red and gray.



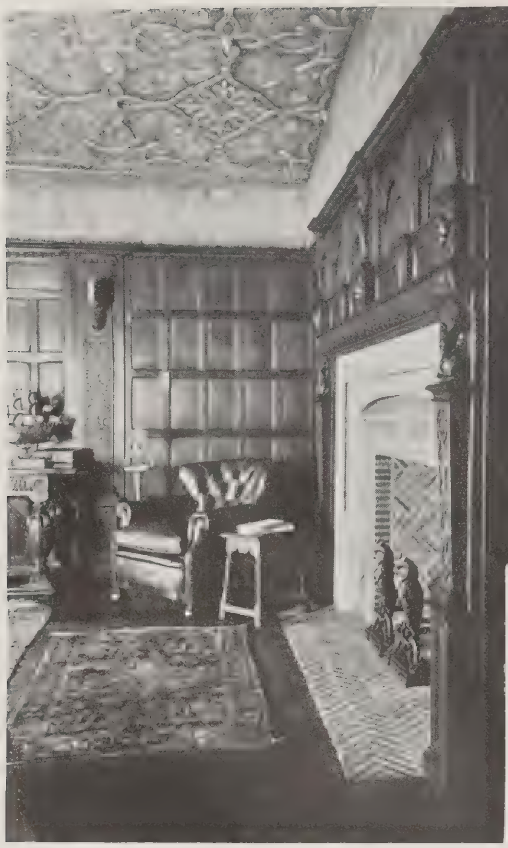
Fireplace in Library
House of Robert Law, Jr., Portchester

Throughout the greater part of the house the jambs of the windows and many of the jambs of doors are of a stone which is of cream color with veining of brown. This stone has been aged or toned by sand-blasting after being set in place. The windows are given added character and dignity by being fitted with metal casements, and the sills are in many instances deeply splayed to make the most of the wall's thickness. Exterior doors are of oak, heavily paneled without and within, and the stiles between the panels are studded with iron nails.

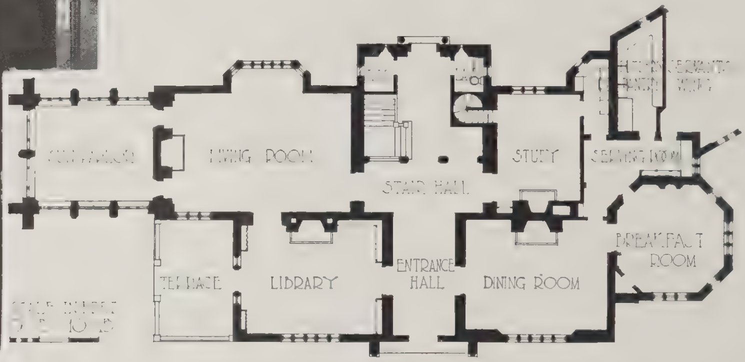
In the study use has been made of more English oak, here in the forms of antique paneling for lining the walls and of an old carved chimneypiece. A frieze of ivory-toned plaster extends about the room above the paneled walls, and the coved ceiling, which is also of plaster, is modeled in an old English all-over pattern. Bookshelves are recessed within certain parts of the paneled walls, and other panels are arranged to form secret doors, one leading into a "trophy room" and the other into a "midnight kitchenette and supper room." The floors of the study are of East Indian teak planks, from 8 to 12 inches in width, of a warm light brown and pegged down. Draperies are of an old English tapestry in a verdure pattern, and most of the furniture, in material as well as character, is in agreement with the interior architecture.

The dining room is arranged and furnished in the style of the English Renaissance. The walls are paneled with American walnut which has been stained and waxed to a deep and lustrous finish, and against this paneling of walnut are placed carvings of pearwood, deeply undercut after the manner associated with the name of Grinling Gibbon. Around the fireplace is a heavy bolection moulding of marble. The floor of this room is of the convent siena marble which is used in several other rooms of the house, and the ceiling is of plaster. With this rich English Renaissance setting go furnishings and accessories which aid in carrying out the style. The furniture is entirely reproductions of antique pieces, and the coverings for the chairs and the draperies at doors and windows are of an English brocade of soft red and silvery gray. The side lights and the chandelier are of crystal.

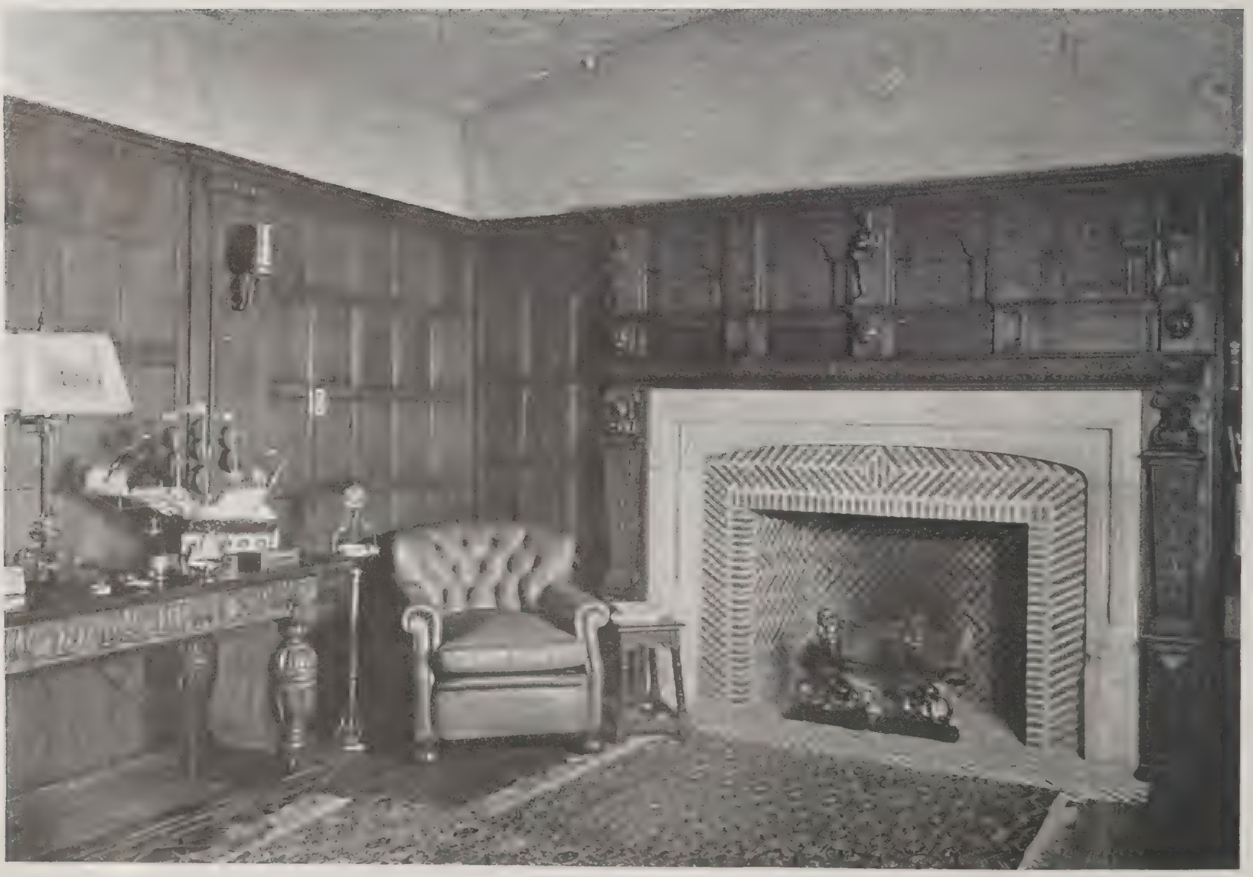
In the breakfast room there is sounded a note quite different from that in which the remainder of the lower floor of the house is set. This is a hexagonal, tower room. Floors are of travertine, and walls and ceiling are covered with canvas upon which has been painted a scene continued around the room, showing a marsh or swamp with much foliage and many bright colored birds; morning light is suggested by rosy colors near the bottom, faint blue above, and bright blue on the ceiling, the entire decoration being much softened and toned. Draperies at the windows are of gray-green taffeta;



Detail of Study

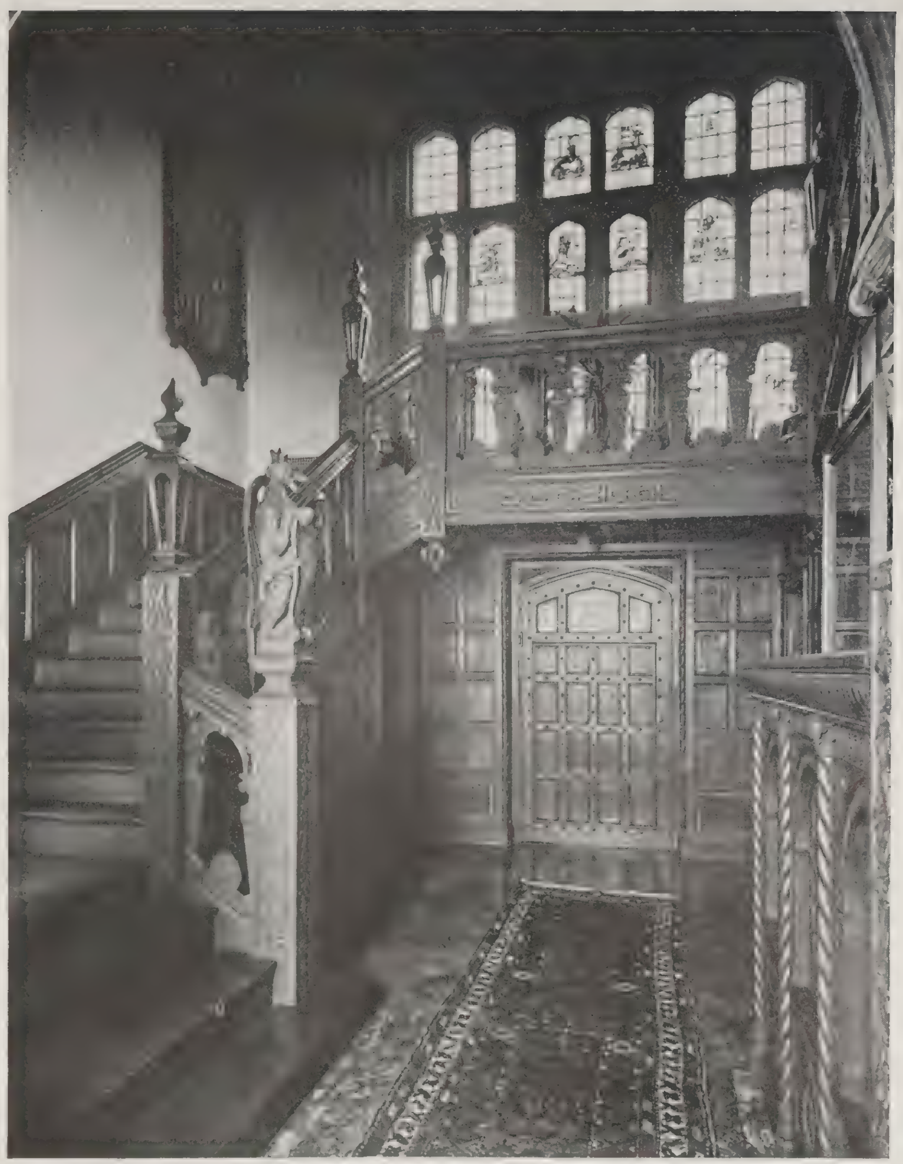


Principal Portions of First Floor Plan

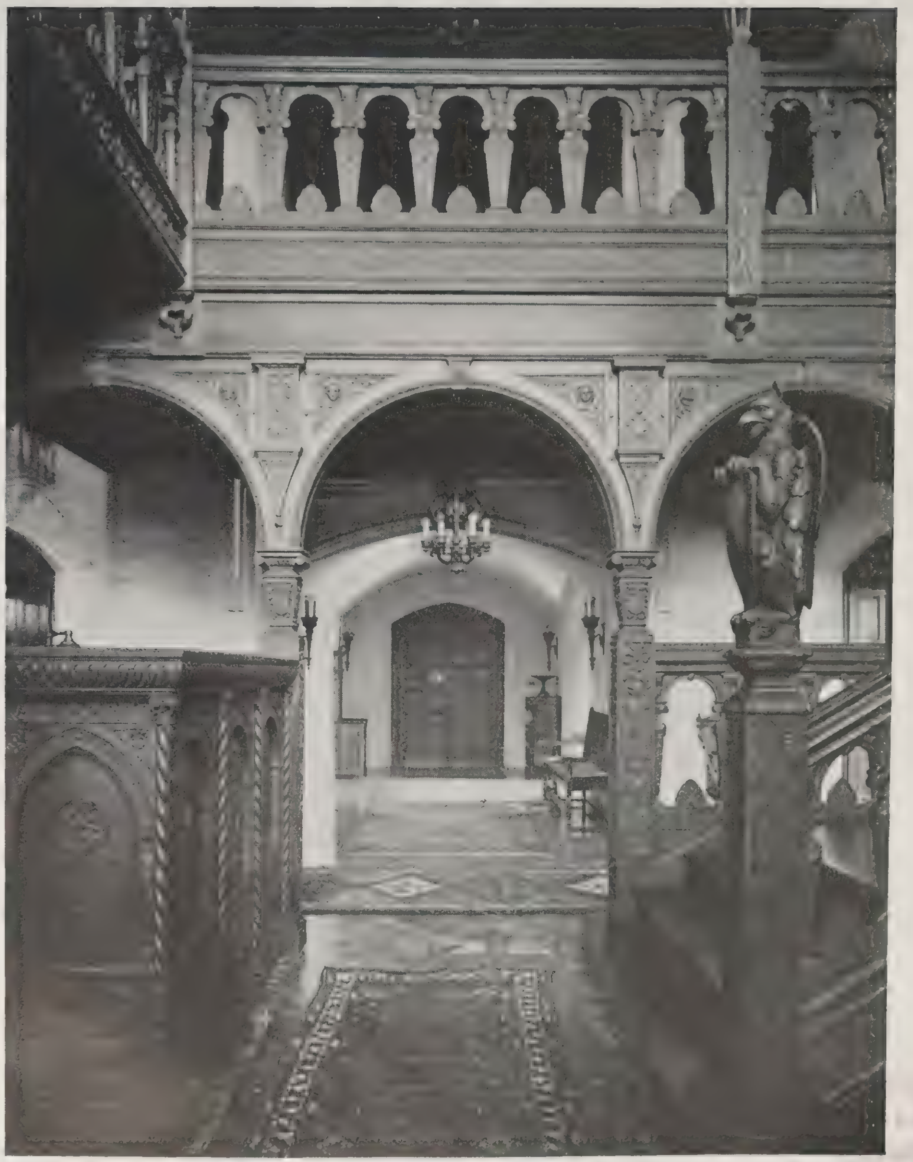


Photos, Paul J. Weber

Fireplace End of Study
House of Robert Law, Jr., Portchester, N. Y.



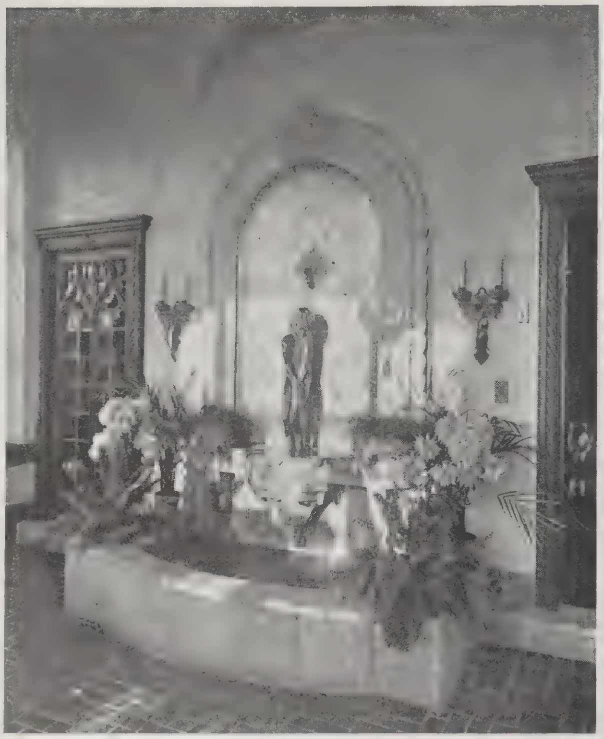
STAIR HALL LOOKING TOWARD ENTRANCE



STAIR HALL SHOWING ORGAN CONSOLE ON LEFT

HOUSE OF ROBERT LAW, JR., PORTCHESTER, N. Y.
DWIGHT JAMES BAUM, ARCHITECT

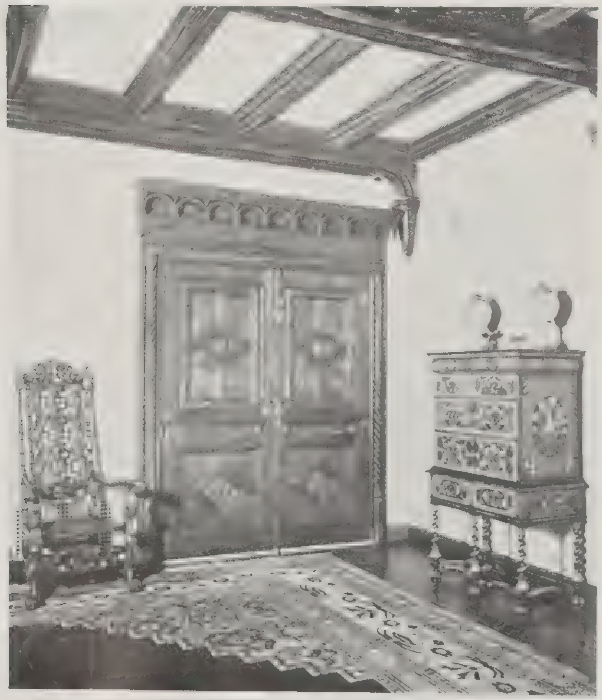
*Photos, John Wallace Gillies*



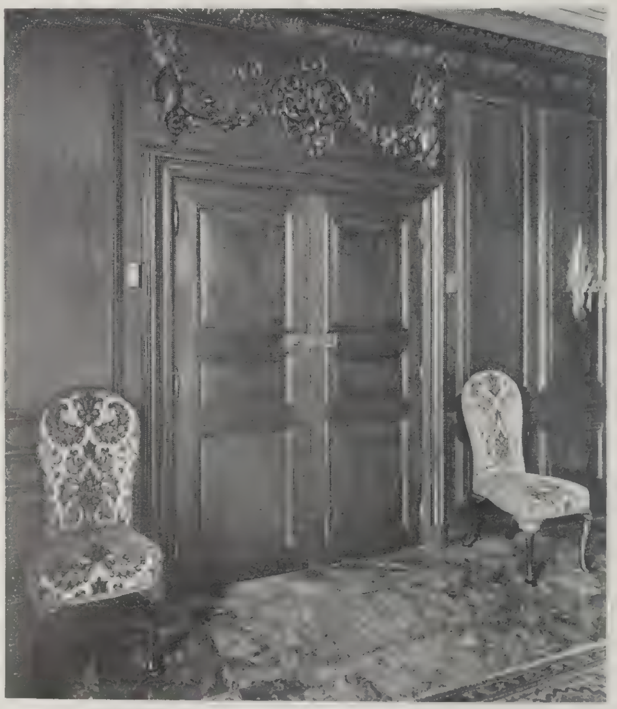
Wall Fountain in Sun Room

furniture is colored old ivory with seats of black patent leather, and tops of black glass are laid upon the breakfast table and several small serving tables. The hanging candelabrum or chandelier is of crystal with stem and arms of amber and prisms of clear glass.

A long vista which extends through several of the rooms of the main floor ends in the sun room. Here the walls and the vaulted ceiling are of a rough textured, warm colored plaster, while the floors are of orange brown tile made with a slight glaze. The window trim is of carved oak, and the sashes are glazed with slightly colored Belgian glass and decorated with panels or rondelles of stained or painted glass such as are used in several of the other rooms. Lighting fixtures, which lend character to any room, are here of iron cut out *en silhouette*. The most important single detail of the sun room is a wall fountain with which is incorporated a niche in the wall. The frame of the niche and the edging of the basin of the fountain are of a deep yellow textured stone, and the inner surface of the niche is lined with a glass mosaic in silver and blue. The figure, which is part of the decoration of the wall fountain, is of bronze. Doors into the living room are filled with glass ranging in color from the palest amber through various shades of brown to dark brown. The carrying out of the decorations and furnishings formed part of the architect's duties and was done under the supervision of Miss Eleanor Mary Wilkie, who is associated with Mr. Baum's organization. It was she who painted the wall decoration for the octagonal breakfast room. The decorations and furnishings cannot be considered complete, however, without the installation of the rugs which are now being made in the Orient. The house has been recently finished and attention is now being given to the development of gardens and the landscape setting. Upon the completion of this work views of the exterior which, like the interior is of Tudor character, will be available.

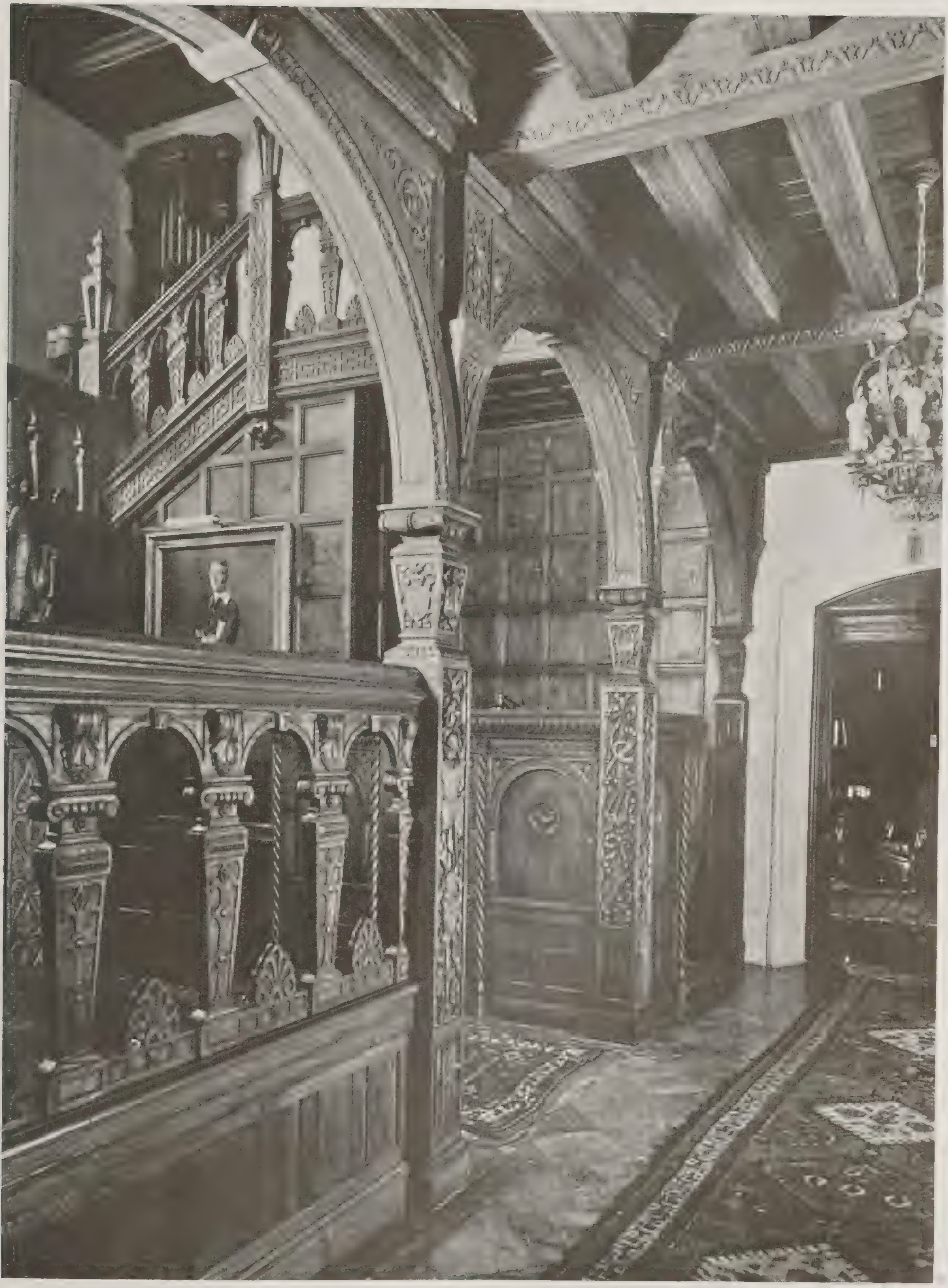


Living Room Door to Hall



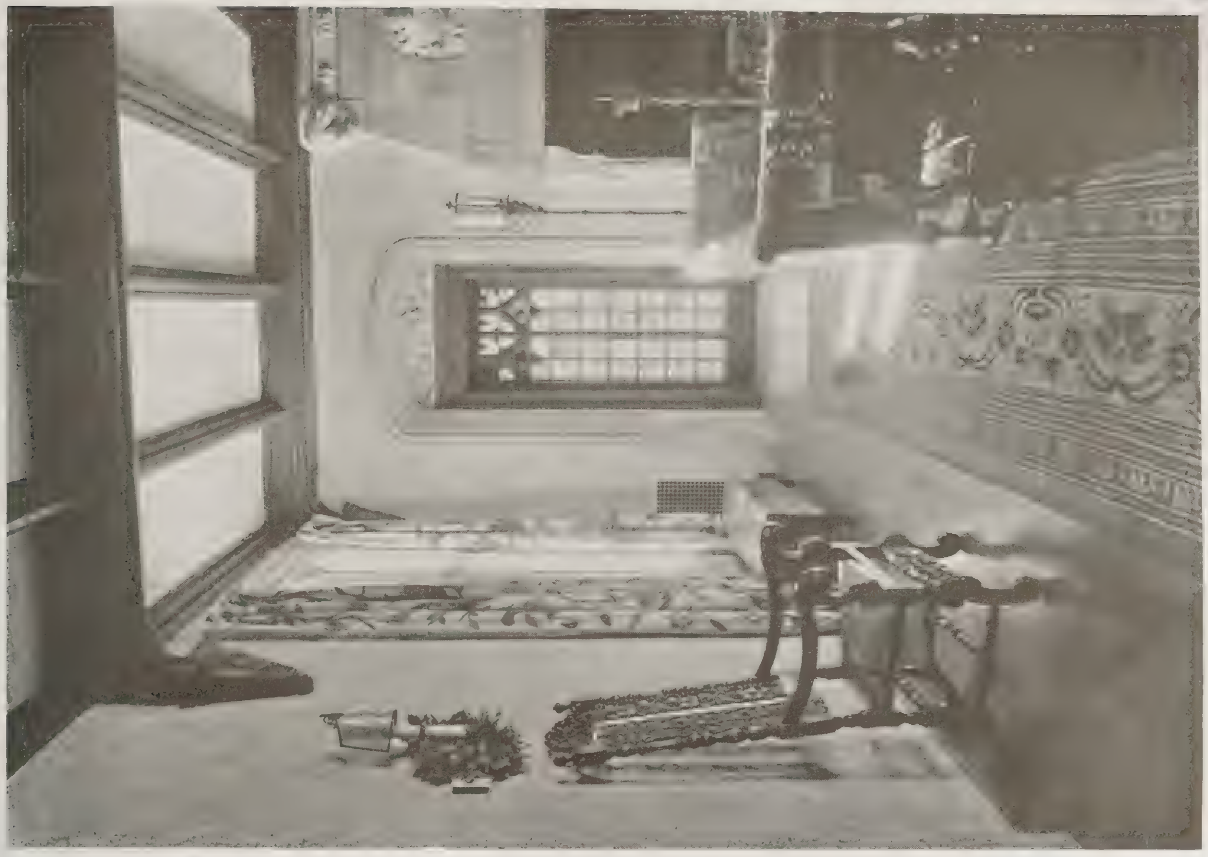
Dining Room Door to Hall

House of Robert Law, Jr., Portchester, N. Y.

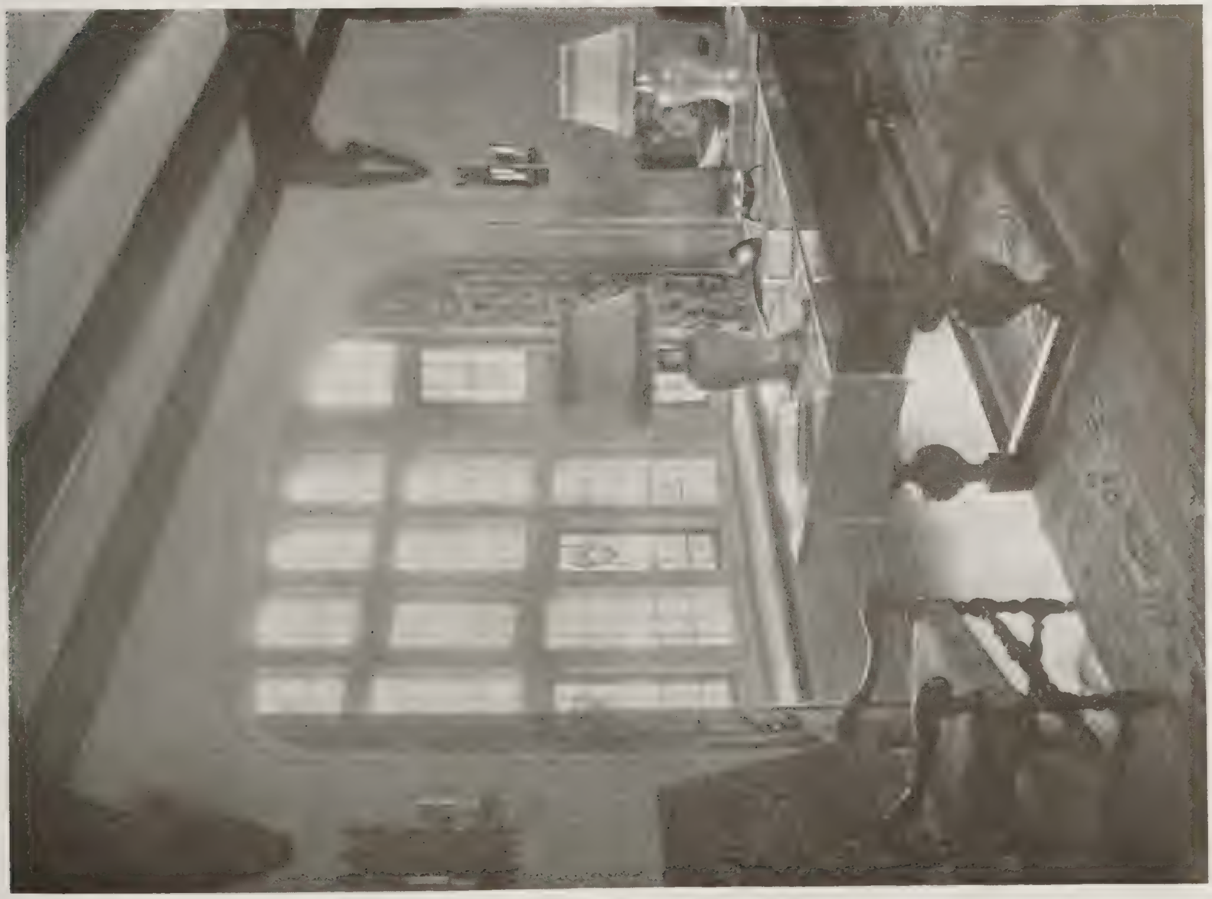


DETAIL OF STAIR HALL LOOKING TOWARD STUDY
HOUSE OF ROBERT LAW, JR., ESQ., PORTCHESTER, N. Y.
DWIGHT JAMES BAUM, ARCHITECT

*Photos. Paul J. Weber*



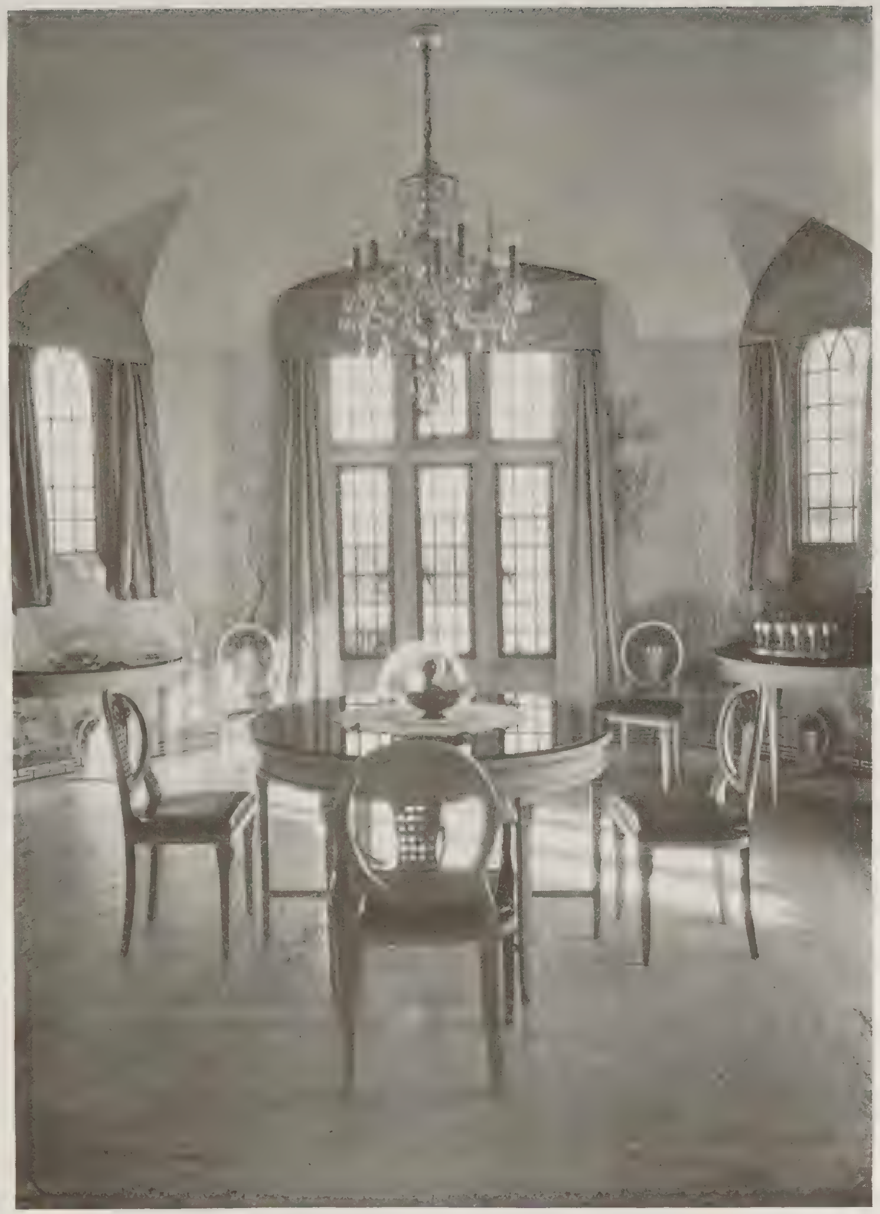
LIVING ROOM TOWARD SUN ROOM



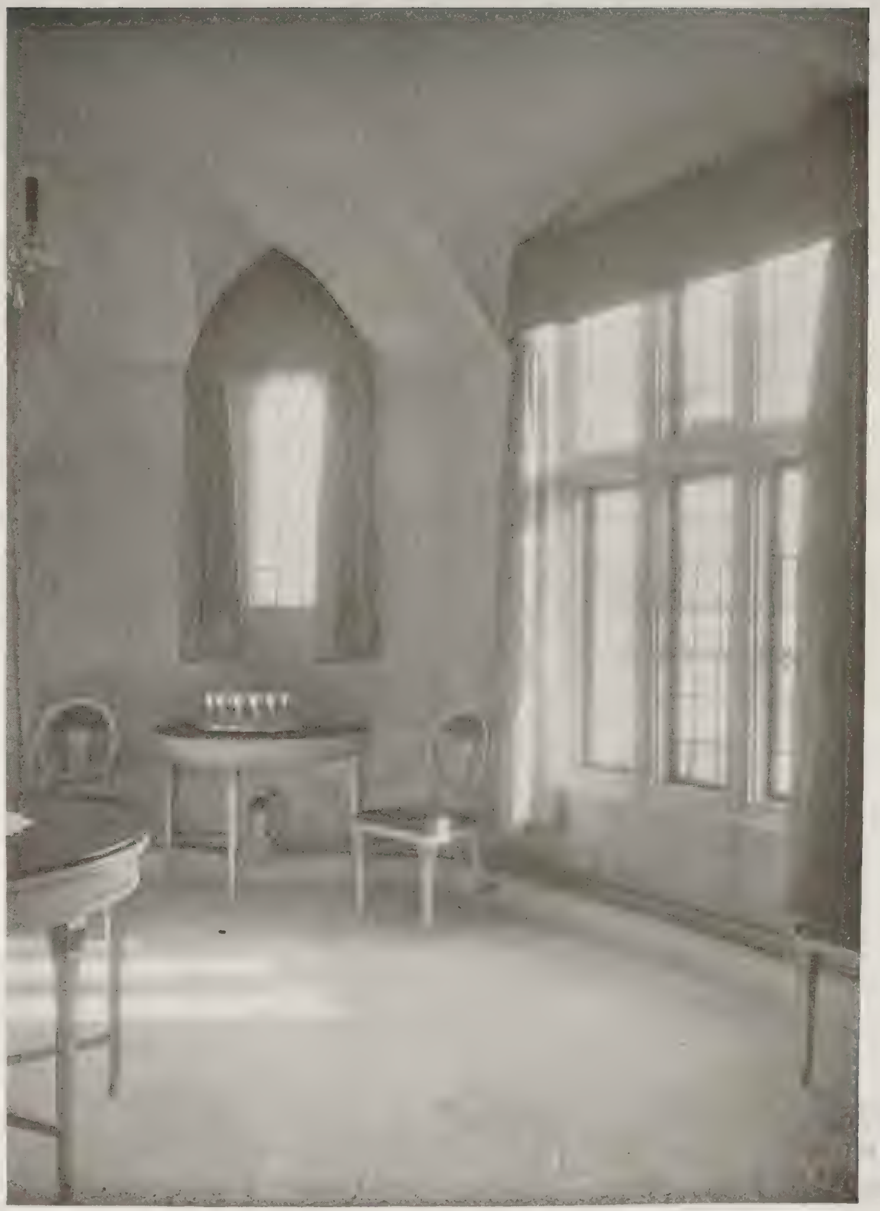
BAY IN LIVING ROOM

HOUSE OF ROBERT LAW, JR., ESQ., PORTCHESTER, N. Y.

DWIGHT JAMES BAUM, ARCHITECT

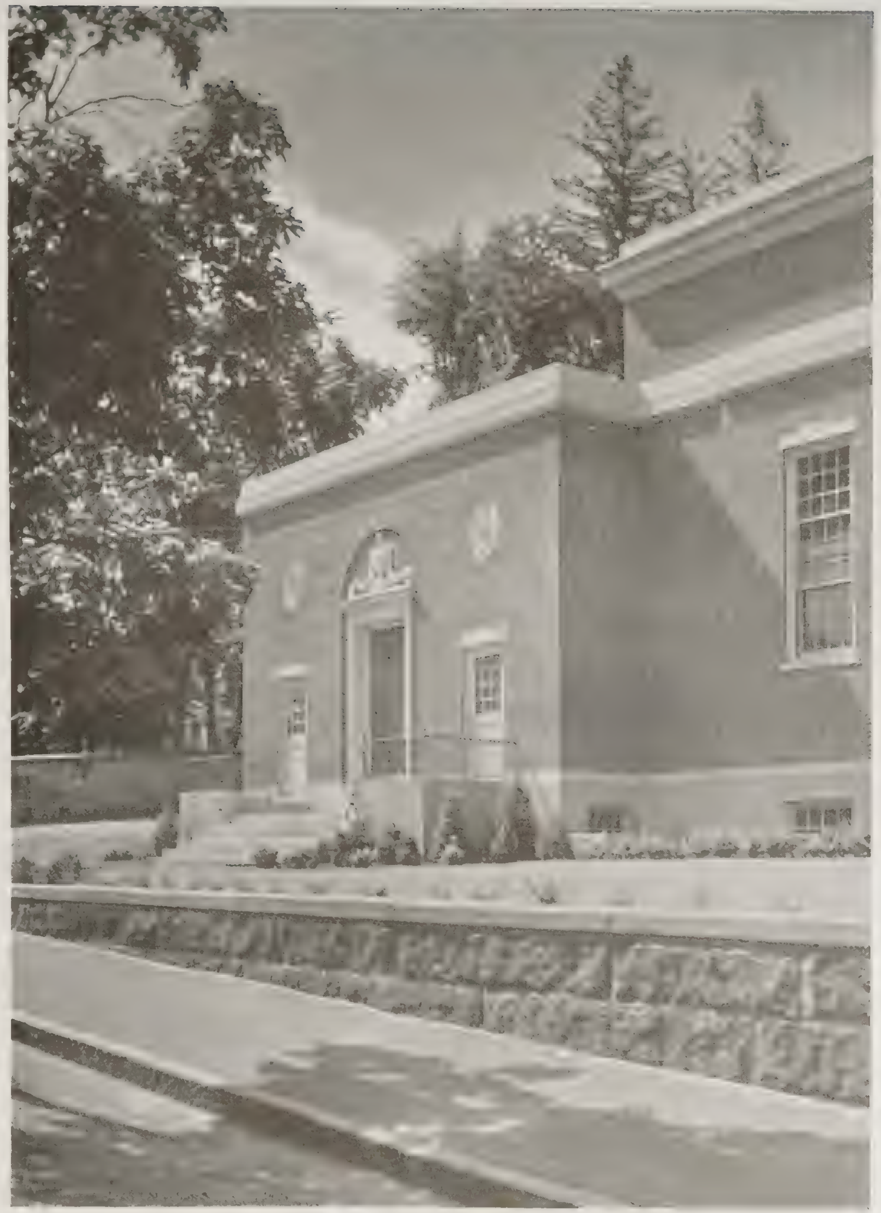


BREAKFAST ROOM FROM DOORWAY

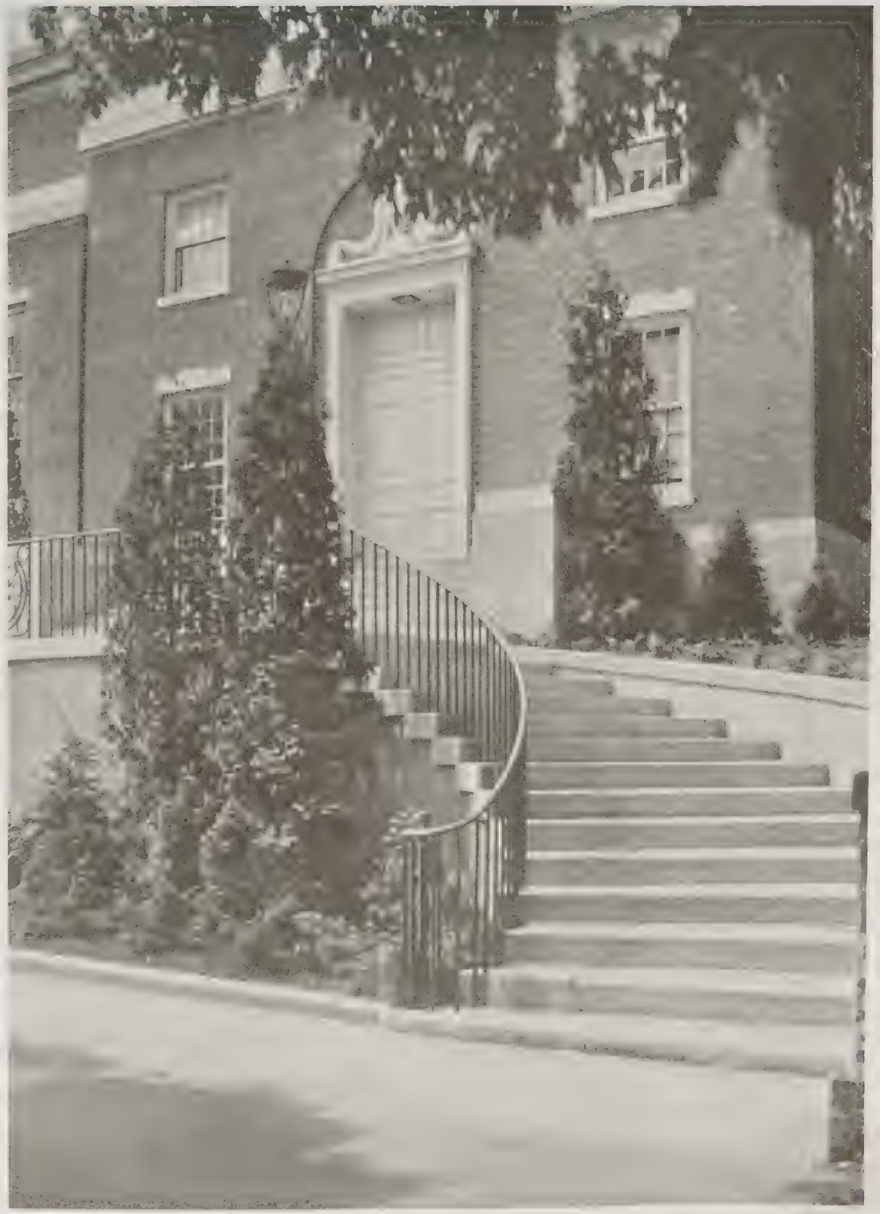


DETAIL OF BREAKFAST ROOM

HOUSE OF ROBERT LAW, JR., ESQ., PORTCHESTER, N. Y.
DWIGHT JAMES BAUM, ARCHITECT



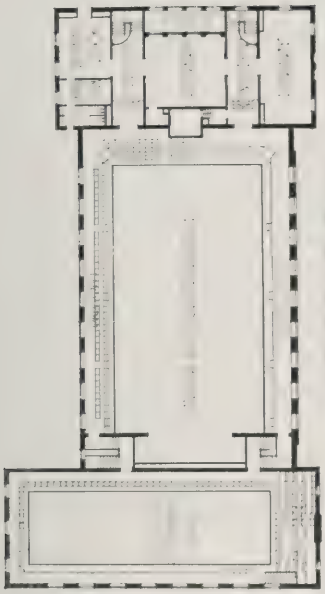
ENTRANCE TO SWIMMING POOL WING



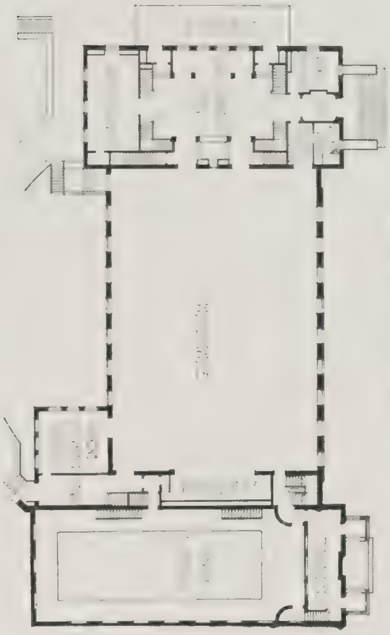
ENTRANCE TO CLUB ROOM WING

GEORGE MARSTON WHITIN GYMNASIUM, WHITINSVILLE, MASS.
J. D. LELAND & COMPANY, ARCHITECTS

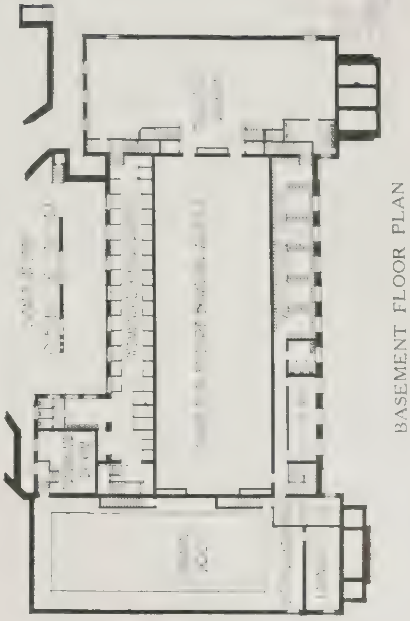
*Photos, Paul J. Weber*



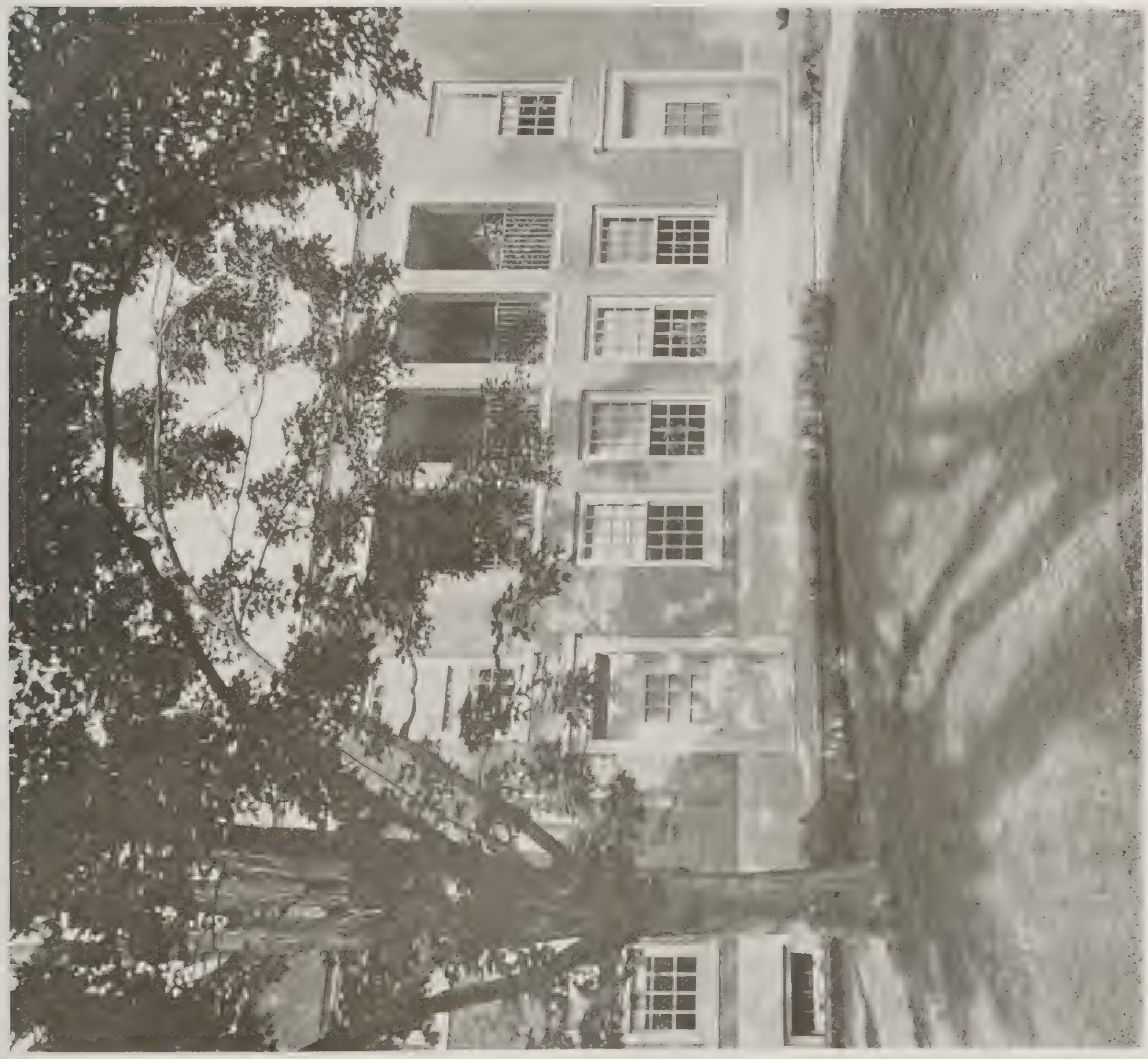
SECOND FLOOR PLAN



FIRST FLOOR PLAN



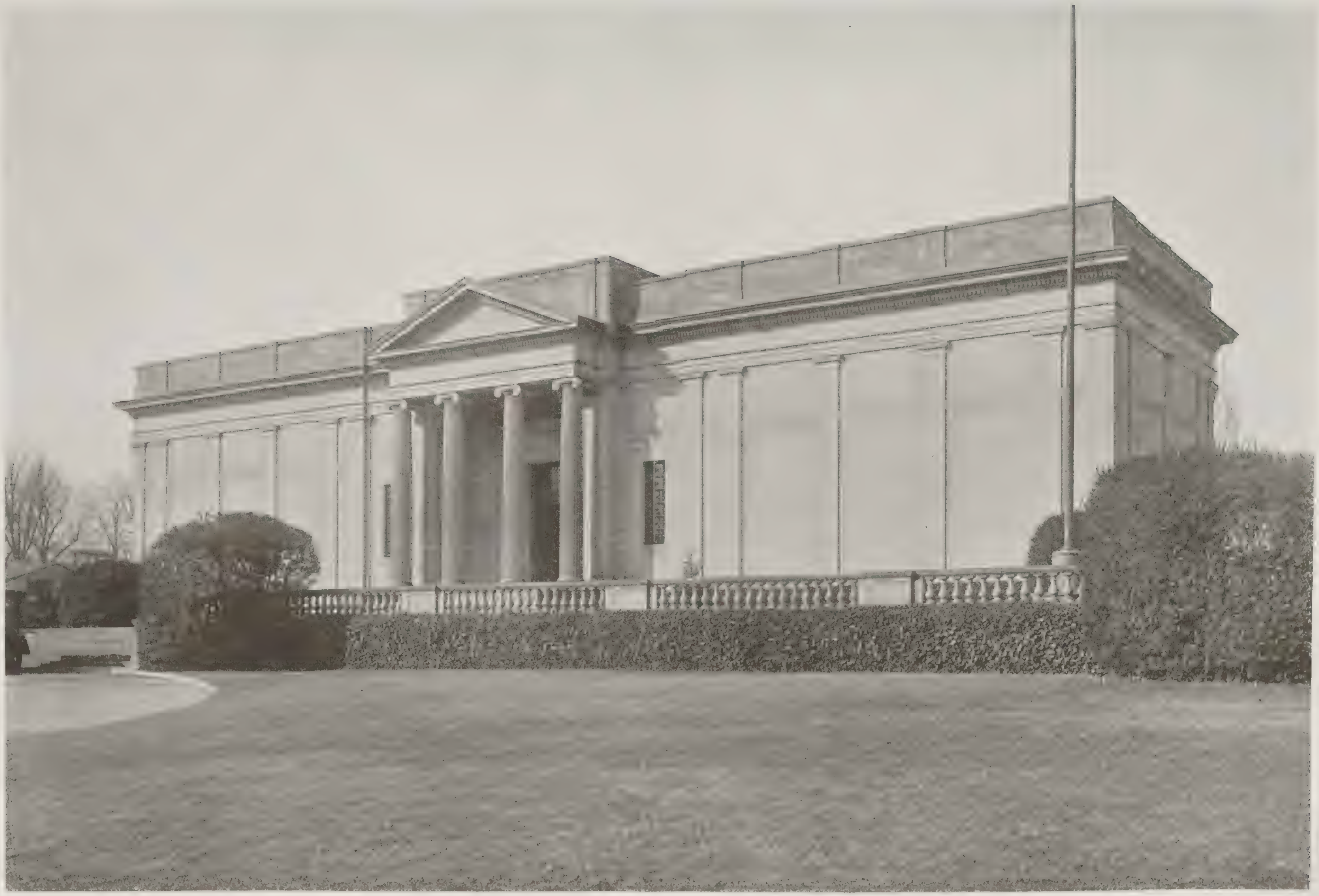
BASEMENT FLOOR PLAN



TERRACE SIDE OF CLUB ROOM WING

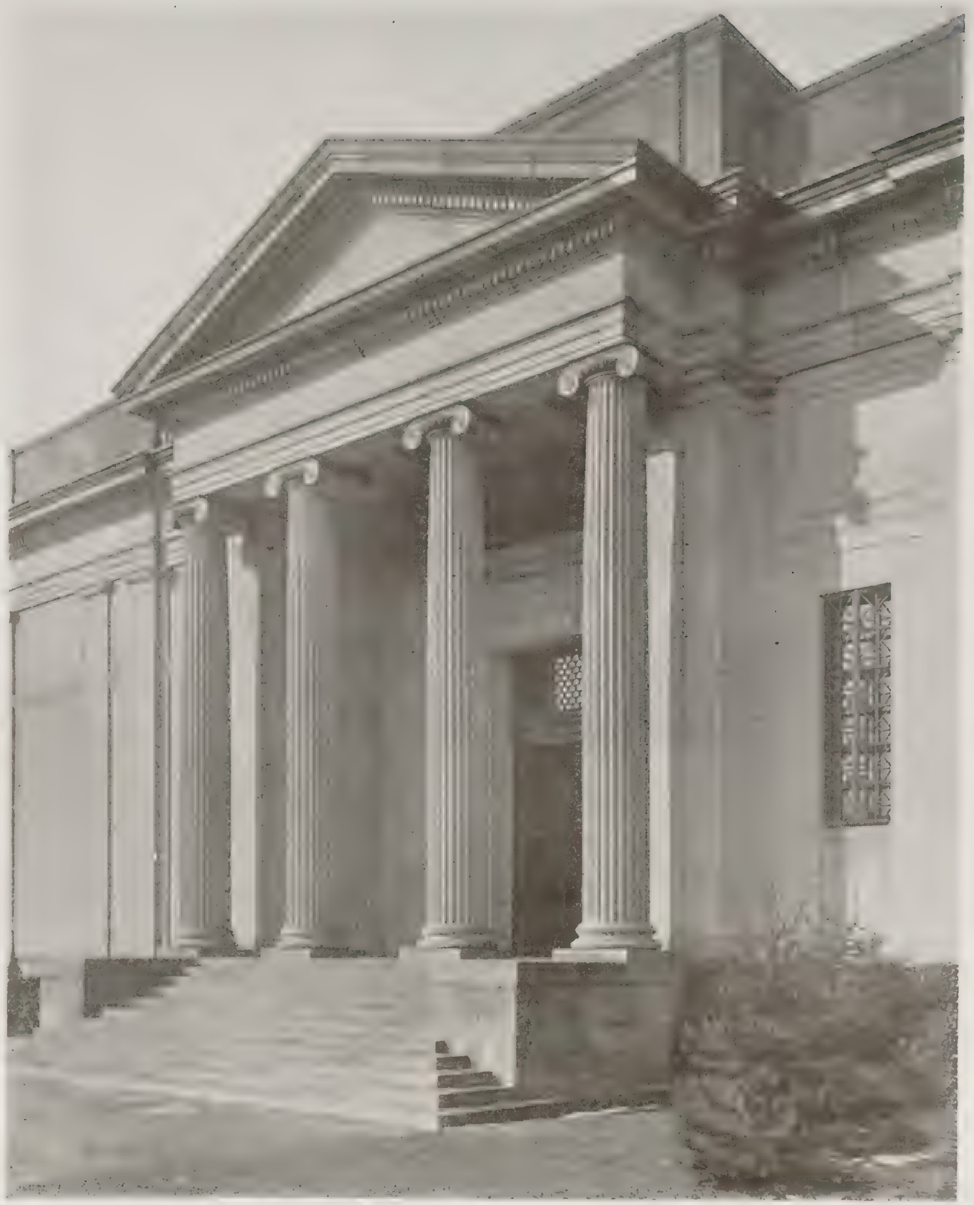
GEORGE MARSTON WHITIN GYMNASIUM, WHITINSVILLE, MASS.

J. D. LELAND & COMPANY, ARCHITECTS

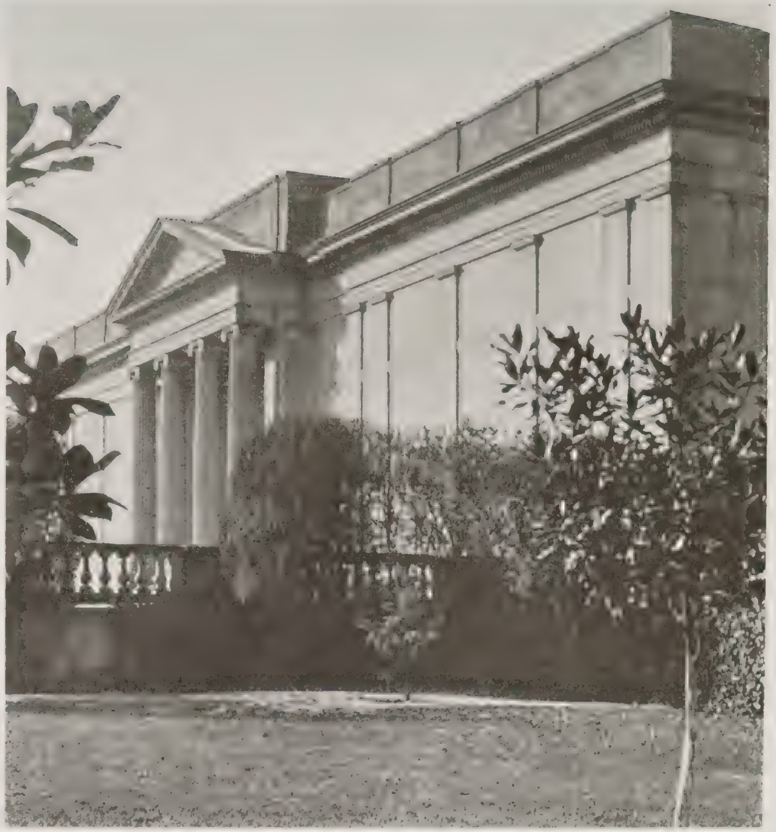


THE CONFEDERATE MEMORIAL INSTITUTE, RICHMOND
BISSELL & SINKLER, ARCHITECTS

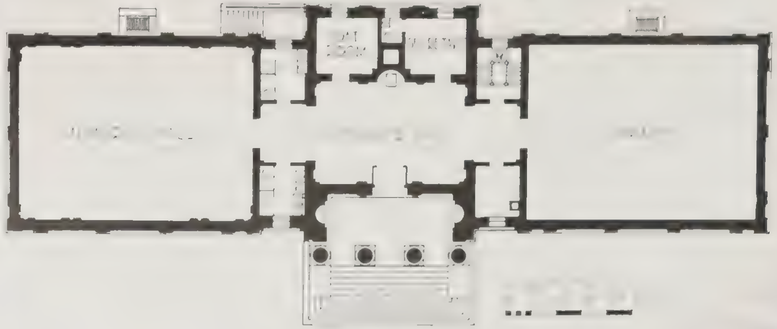
*Photos, Tebbs & Knell, Inc.*



DETAIL OF PORTICO



FACADE FROM LOWER TERRACE



MAIN FLOOR PLAN

THE CONFEDERATE MEMORIAL INSTITUTE, RICHMOND
BISSELL & SINKLER, ARCHITECTS

# Small American Museum Buildings

### *By* JOHN H. SCARFF

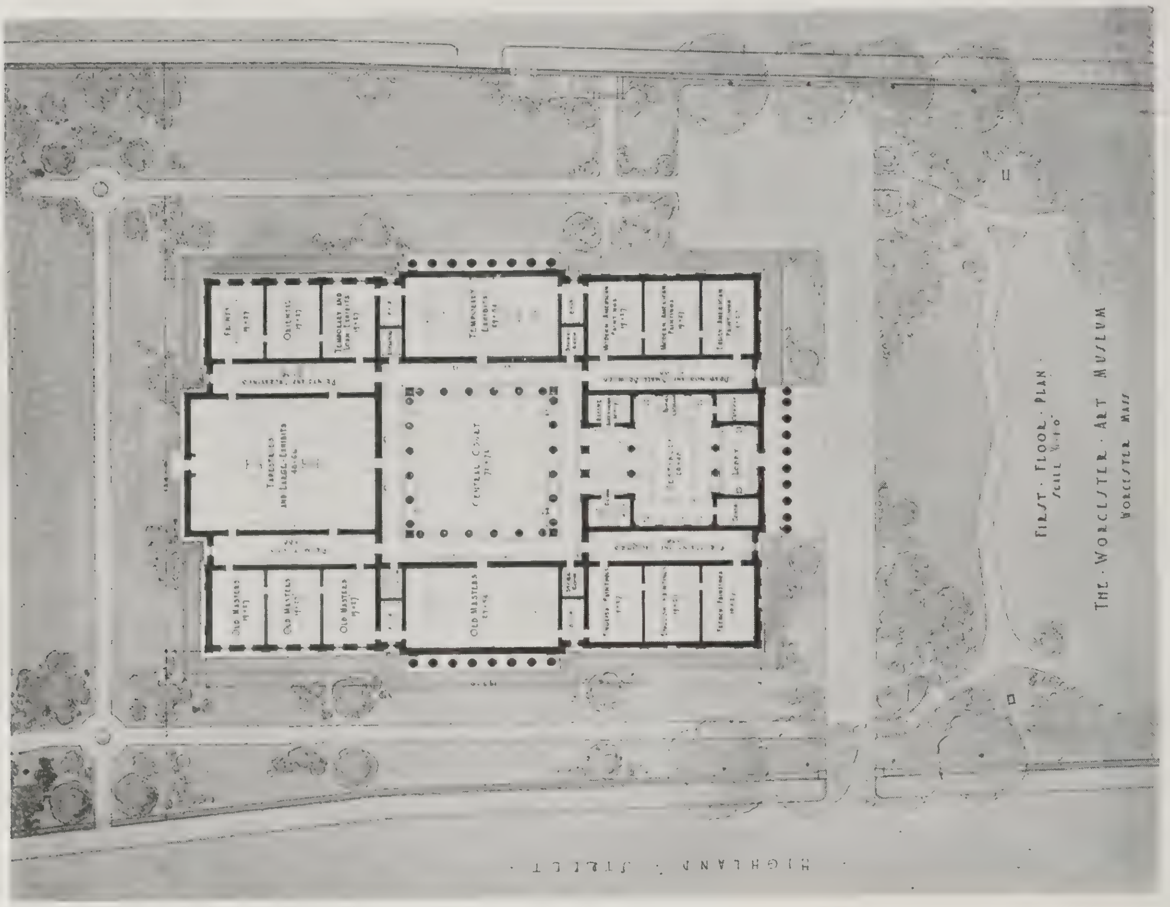
RECENT study of American art museum buildings, that included a visit to nine of the principal small art museums of our Eastern cities, brought to the author's attention a number of details that are of vital importance to the economical and efficient management of a modern museum building.

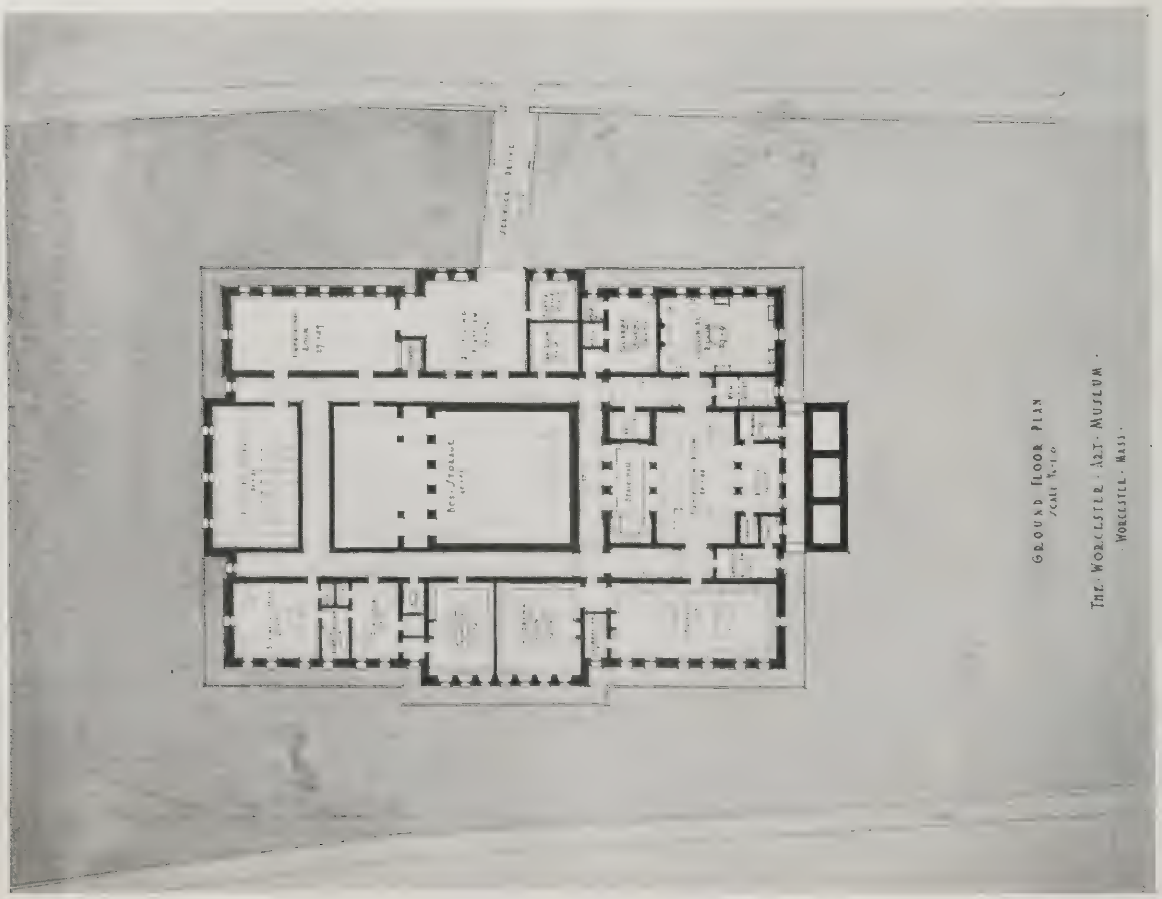
The scope and usefulness of the museum building are rapidly widening. The old idea that an art museum is a storage place for objects of art is giving way to the broader conception of the art museum as an active and vital force in stimulating the cultural interests of the community. The modern gallery is not only a place where objects of enduring value can be cared for and handed down to posterity, but also a place where the old as well as the new can be displayed to the greatest advantage; a place properly arranged for transacting the various forms of business connected with its activities; where visiting exhibits, often of very large size, can be effectively handled and protected, and a building designed to reach and interest the various groups and classes, including both children and adults, that may seek simply shelter from the rain, study for professional activities or, most important of all, pleasure. Then too there are the school, lectures, and all kinds of gatherings, and perhaps musicales where large audiences must be taken care of. There are the "docent" service and a modern library where books, photographs and slides can be properly displayed and studied. Not only must there be provided facilities for displaying each object of a loan or permanent exhibition, but each of the different activities must be understood in advance and provided for so that the whole building may represent a successful solution of the complicated problem presented.

It is recognized that each museum, according to its aims, must be a problem in itself, but a few difficulties common to all will be noted, and from the general consensus of opinion a solution suggested that applies to all but the very large.

Entrance facilities for the ordinary visitor; for those who come to see an officer of administration; for the delivery of packages; for the delivery of objects; for service and employes, and for the auditorium and the school must be provided, so that each part of the building is as independent as possible of the others, and can be reached simply and directly. Separate entrances for all are obviously both impossible and undesirable, and for reasons of economical control it is necessary to concentrate. All visitors can be brought to one entrance, but if the architectural effect requires a long series of steps and terraces, a covered drive approach should be provided in connection. Then from a common ves-

Design for the Worcester Art Museum, Worcester, Mass.
John H. Scarff, Architect





DESIGN FOR WORCESTER ART MUSEUM, WORCESTER, MASS.
JOHN H. SCARFF, ARCHITECT

tibule, where should be ample coat rooms, the catalog room and postal booths, telephones, etc. Before entering the museum proper it should be possible to reach the administration offices and also the lecture room, which should share the coat room facilities, but otherwise be independent of the museum. A large auditorium and a school in the same building would perhaps need separate entrances.

For service and the reception of objects use could be made of the same entrance, which should be next the superintendent's office. For the reception of objects there are a few arrangements that are absolutely essential. The receiving floor should be from 2 feet, 6 inches to 3 feet above the wagon drive and at one level. For objects, the opening, preferably covered, should be at least 5 feet wide by 10 feet high, and for ordinary service a smaller door could be arranged within the larger, which in turn would be better if designed to slide. The receiving room, which should be large and light, should connect directly with the workshops, freight elevator, repair shops and either a storeroom or a room in which objects could be put directly upon unpacking, while awaiting installation. The box storage room should be large enough to arrange boxes so that one can be had without moving others, and if it does not connect directly with the receiving room it should connect by means of the elevator. It needs no light, but if the ceiling is low the opening must be wide enough to take boxes of large dimensions. It is desirable also that the elevator connect not only with the photographic room under the roof, but also with the attic space.

About gallery floors and walls there is a wide difference of opinion. Where marble or terrazzo floors are used, they are usually too light in color; when wood is used in combination with marble, the floors are difficult to maintain. They are also more expensive to care for, and it sometimes necessitates the closing of a room for a day from time to time. In the later galleries, cork carpet over cement is being tried. General opinion favors wood walls for picture galleries as giving more freedom of arrangement and doing away with the unsightly hanging devices. The importance of keeping the picture level of walls free from disfiguring and inconvenient details of apparatus is not always realized. Thermostats, signal boxes, electric push-buttons, large switch boxes, and even ventilating grilles were observed on those portions of walls designed for pictures.

Too many doors are usually provided, and unless some special architectural effect is desired, the simpler the treatment of the openings the better. Other things being equal, they should be in the corners of the rooms and not in the centers; in the side-lighted galleries, next the windows. Arrangement in a line makes supervision of the rooms easier and also allows pleasing vistas. The only artificial light giving anything like satisfaction for galleries is the white light above a diffusing glass. Radiators, which are usually supplied in too great numbers, greatly disfigure the galleries, and the improvement obtained by their concealment certainly justifies the expense.

Ventilation can be arranged in connection with the heating, and much is gained by using a flexible system with independent units. It is also economical to re-circulate the air at times when the building is not in constant use. It is absolutely essential to provide special ventilation for the attic spaces, where excessive heat causes not only leaks in the roofs but discomfort in the rooms below. An arrangement with exhaust ventilation from the galleries through the attic space offers a suggestion. The attic space itself needs special attention. Apart from the important and complicated question of light, which is influenced by the depth of the space, for reasons of easy maintenance there should be at least 5 feet between the ceiling glass and the roof trusses.

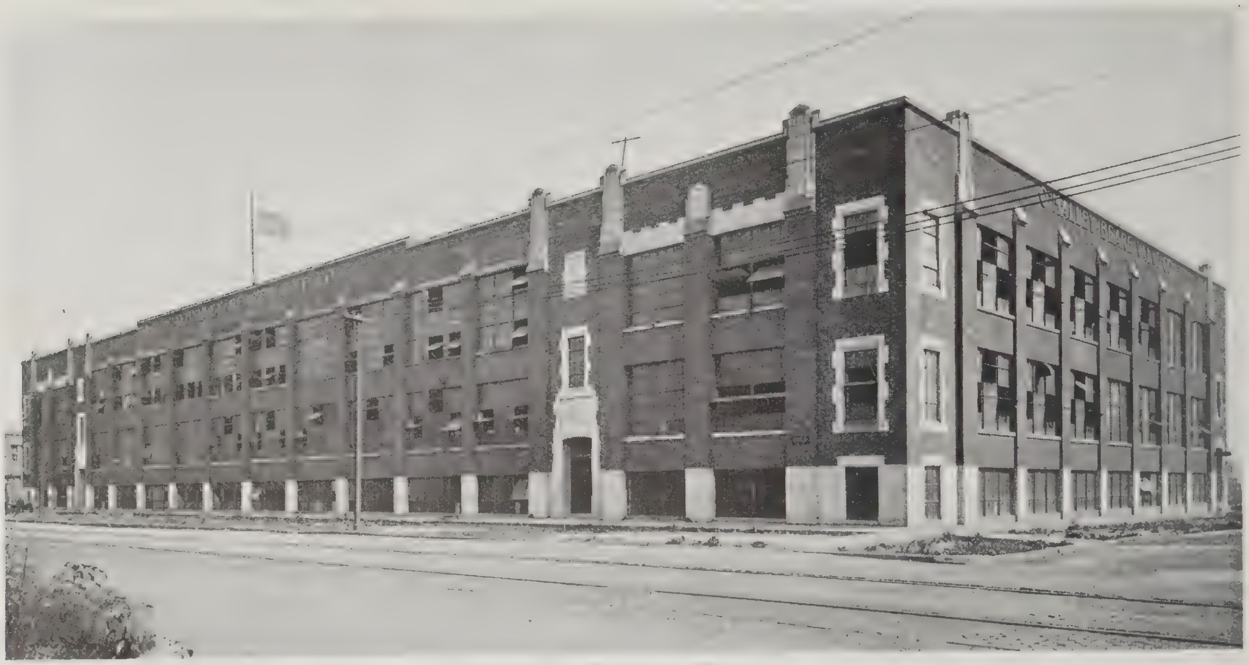
The type of plan adopted has always been formal and symmetrical, with galleries high and bare, where the pictures looked as if they were in storage. A plea is made for a more flexible type building, with its exterior more intimately related to the needs of the interior, and where the claims of architectural magnificence do not overshadow those of the objects displayed. A desirable arrangement of plan, and one possible in the smaller galleries, is one that allows the visitor, after passing the vestibule entrance to offices and services, to go at once to some central point from which he can go to any room without passing through many others. In this way his attention is not diverted, nor is he fatigued by seeing too much.

It is the author's opinion that museum directors demand too much light, that there are too few galleries with side light, and that more side lighting for modern pictures would encourage the decorative treatment that we admire so much in the older work. If the old pictures could be hung in relation to other objects of art of the same period, in something approximating their original intended position and light, it would make a stronger appeal to the average visitor who could in this way have a better understanding of the relation between art and life. Also the usual tendency is to make the galleries too large, where each picture, if it cannot compete with its long line of neighbors, is lost, and where there is absolutely no opportunity to give a picture deserving it, individual treatment.

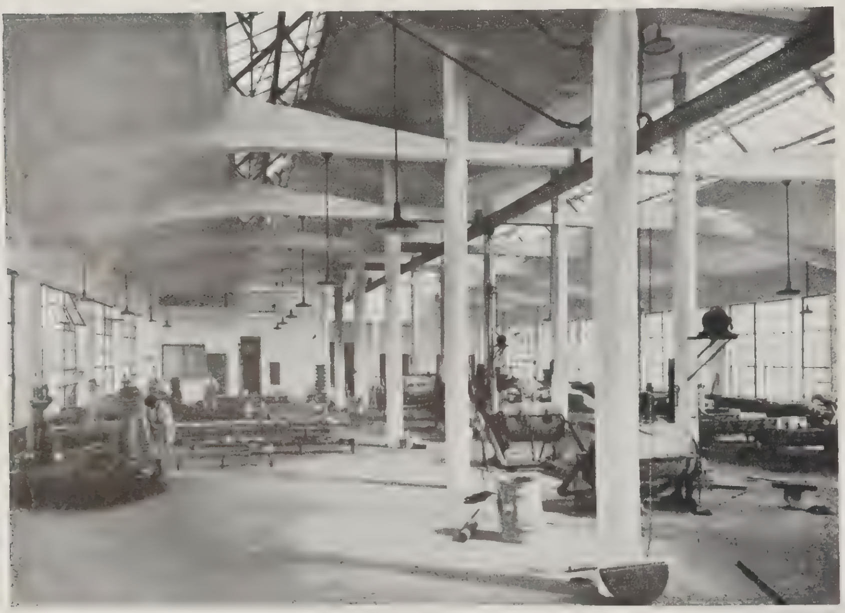
The accompanying designs are a part of a report of recommendation to the Worcester Art Museum, Worcester, Massachusetts, for which the investigation was undertaken. The idea is that this building should house a small but choice collection, and that it would always be used in connection with the present building, which is near by. The present building in this scheme will continue to accommodate the school and the school equipment, casts and reference documents, and this will obviate in the new building the many unfortunate compromises of installation that are necessary in so many museums.

# O'Malley-Beare Valve Company Factory, Chicago

RICHARD E. SCHMIDT, GARDEN & MARTIN, ARCHITECTS

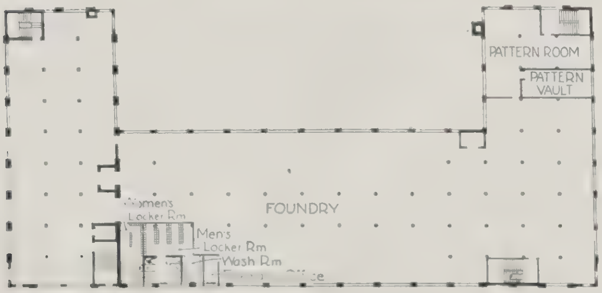


GENERAL EXTERIOR VIEW

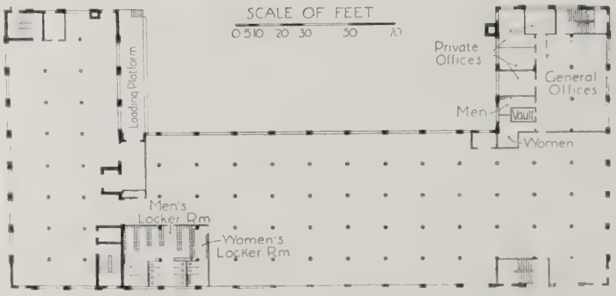


• Foundry, Center Portion of Second Floor

*THIS building has been built in two sections, the unit at the extreme left being the original structure. The exterior walls are of brick and the floors are of reinforced concrete construction, beam and girder type with concrete columns. The typical bay is 14 x 16, the girders running the long way of the building. The center part of the second floor is a foundry with a modified scissors type of concrete truss supporting a monitor roof with continuous sash. This construction has been approved by the Illinois Factory Inspector for foundries without the use of hoods or flues, the gases finding their exit through the enormous monitors.*



First Floor Plan



Second Floor Plan

# Height of Buildings in Boston

*By* JOHN R. NICHOLS, *Consulting Engineer*

IN the race between mounting costs of labor and materials on one hand, and the art of building construction on the other, architects and engineers must look sharply to see that no avenue escapes them for reaching any means of reducing costs. Two measures of economy have become available in Boston within the last few months. One of these is economy in the use of valuable land through increased permissible height of buildings; the other is increased allowable stresses in structural steel. A brief study of the effects of these changes is presented in the belief that it will be of interest not only to architects practicing in Boston, but also, in anticipation of similar changes elsewhere, to a wider field.

The Massachusetts Legislature (Acts of 1923, Chap. 462, Sec. 11) increased the height permitted for buildings within certain districts in Boston from 125 to 155 feet. In the design of new structures no difficulty will be experienced in providing columns and foundations for buildings of any desired height within the legal limits. The question will arise, however, as to the practicability of extending the height of existing buildings. The factors bearing on this question are allowable stresses in materials and required live load capacities.

Existing buildings affected by the new law are usually of steel frame, and office buildings predominate. The legislature, which writes Boston's building code, has not recently increased permissible stresses in structural steel, and the building commissioner has no authority to permit higher stresses than are provided in the law. The Board of Appeal has such authority, "in specific cases which appear to them not to have been contemplated by this act although covered by it, or in cases where manifest injustice is done,—" The Board of Appeal has recently approved, and, the writer is informed, may be relied upon in each case to approve stresses in structural steel 12½ per cent in excess of those allowed by the building law, provided the rolling mill furnishes an affidavit that the steel was rolled for the building in question and was made by the open-hearth process; together with a sworn analysis that shows the steel to have a phosphorus content not greater than that allowed by the standard specifications of the American Society for Testing Materials, for structural steel for bridges. It may be possible to obtain the necessary affidavits in the case of an existing building, and the authorities might be satisfied with a chemical analysis of steel cut from the framing, but the writer has had no assurance of this. And even though the columns might safely be loaded more heavily, the board would need to be satisfied that the foundations were sufficient for the stories to be added. The allowed increase in steel stress is not, therefore, enough by itself, to make possible increasing the height of existing buildings.

In the case of office buildings erected before 1918, however, the other factor has an important effect in favor of extension. A number of changes affecting floor loads were enacted by the legislature in that year (Chap. 179). These include reduction in the live load required in office buildings from 100 pounds per square foot, which obtained as far back as 1895, to 75 pounds per square foot. At the same time the allowed reductions in live loads for columns, walls, foundations, etc., carrying two or more floors were materially increased. This table shows the amount of the reductions allowed prior to 1918 and since the change:

| Carrying | 1907 to 1918 | Since 1918 |
|---|---|---|
| 2 floors | 15 per cent. | 25 per cent. |
| 3 " | 20 " " | 40 " " |
| 4 " | 25 " " | 50 " " |
| 5 " | 30 " " | 55 " " |
| 6 " | 35 " " | 60 " " |
| 7 " | 40 " " | 60 " " |
| 8 " | 45 " " | 60 " " |
| 9 " or more | 50 " " | 60 " " |

Another change in the law was in the formula for allowable unit stress in steel columns, which prior to 1918 was $\frac{16000}{1+\frac{L^2}{20000r^2}}$ and thereafter

$20{,}000-100\frac{L}{r}$ (Max. 12,000), where L is length of column and r is radius of gyration, both in inches. For a value of $\frac{L}{r}$ equal to 80 the stresses derived from both formulæ are nearly the same. As the slenderness increases, the new law requires lower stresses than the old, with increasing difference. The columns in the lower stories of the building, heavily loaded, are likely to have a low value of $\frac{L}{r}$, and the change in column formula will probably not seriously affect the results. It may, therefore, be found that office buildings erected before 1918 have enough strength in foundations and in columns (except in upper stories) to sustain an increase in height.

The writer has worked out an assumed case numerically and presents these results:

Bay: 14x20. Floor area 280 sq. ft.
Dead loads: Roof 70 lbs. per sq. ft.
    Floors 100 lbs. per sq. ft.
    Column 2,400 to 6,000 lbs. per sq. ft.
Live loads: Roof 40 lbs. per sq. ft.
    Floors, prior to 1918, 100 lbs. per sq. ft. in upper stories.
        125 lbs. per sq. ft. in first story.
        In 1923, 75 lbs. per sq. ft. in upper stories.
        125 lbs. per sq. ft. in first story.

Table of Total Loads (1,000 lb. units) in Columns

| Column under | 11 Stories before 1918 | 12 Stories 1923 | 13 Stories 1923 |
|---|---|---|---|
| roof | (33.2) | (33.2) | 33.2 |
| 13th floor | .. | .. | 85.2 |
| 12th " | .. | 85.2 | 124.0 |
| 11th " | 92.2 | 124.0 | 160.5 |
| 10th " | 141.0 | 160.5 | 195.5 |
| 9th " | 192.0 | 195.5 | 233.5 |
| 8th " | 240.5 | 233.5 | 269.0 |
| 7th " | 287.0 | 269.0 | 310.5 |
| 6th " | 330.5 | 310.5 | 352.0 |
| 5th " | 371.0 | 352.0 | 393.0 |
| 4th " | 410.0 | 393.0 | 435.5 |
| 3rd " | 446.5 | 435.5 | 478.0 |
| 2nd " | 494.5 | 478.0 | 520.0 |
| 1st " | 546.0 | 526.0 | 568.0 |

From this it would appear that one story could be added to the 11-story office building without strengthening the interior columns below the eighth floor, or strengthening the foundations. The addition of two stories, with the data assumed, increases the loads in all the columns and in the foundations. The increase below the seventh floor is less than 8 per cent. Above the seventh floor the increase is greater than 12½ per cent. If the required assurance is forthcoming that the steel has the necessary high quality, and if the foundations are found sufficient for their 4 per cent increase in load, the board should be willing to approve the addition of two stories without strengthening the interior columns below the seventh floor. Ingenuity in trimming the dead weight of the added floors and roof would doubtless result in a better comparison of figures than that presented. The prospect of adding three stories to an office building is not good, unless, of course, it was originally designed for more stories.

Conditions are more favorable for building additional stories if the dead weight of floors is less than that assumed. On the other hand, they are less favorable in the case of exterior columns and those carrying walls other than temporary partitions. Cognizance would have to be taken in each case of the change in column formula, which might affect the results.

The case of reinforced concrete buildings is different. Very few, if any, reinforced concrete buildings were erected to the height limit before 1918. Increase in their height is not affected by the recent change in the height limit and is not, therefore, a new problem. Since 1918 a number of buildings have been erected to the limit of height as it then existed. Although some are now used, at least in part, for office purposes, many were designed for loft buildings to carry factory or warehouse loads, and, insofar as warehouse loading prevailed, the live loads were not reduced in columns and foundations, as is permitted in office buildings. In 1918 the sections of the building law covering the design of reinforced concrete were entirely rewritten, and the unit stresses materially increased. The 1918 law also permits 25 per cent increase of stress in concrete more than a year old.

The greater weight of reinforced concrete construction, as compared with steel frame, is somewhat unfavorable to adding stories, as was pointed out in the analysis of the steel-framed office building. On the other hand, the difference between interior and exterior columns is less. Considering, therefore, that the added stories may be made as light as possible, and that the circumstances mentioned as favoring the possibility of increased height have great influence in the results, the writer is of the opinion that two or three stories could probably be added, in converting a concrete building to office purposes, with very little alteration of the existing structure. Strengthening should be less expensive with reinforced concrete than with steel.

This actual case of a reinforced concrete building 11 stories high, erected in 1920 for loft purposes, in Boston's wholesale leather district, although somewhat special, illustrates the possibilities of increasing the height of such buildings:

Typical Interior Column; Floor Area: 462 sq. ft.

| | | | |
|---|---|---|---|
| Dead Loads: | Roof 67,900 lbs. | | |
| | Floor 65,500 lbs. | | |
| Live Loads: | Roof | 40 lbs. per sq. ft. | 18,500 lbs. |
| | Floor | 250 lbs. per sq. ft. | 115,500 lbs. |

Live Loads were reduced to 50 per cent.

Table of Column Loads—1,000 lb. units

| Column under | Original design load | Present column capacity | Office building loads |
|---|---|---|---|
| roof | .. | .. | 55 |
| 14th floor | .. | .. | 140 |
| 13th " | .. | .. | 204 |
| 12th " | 86 | 166 | 289 |
| 11th " | 268 | 396 | 359 |
| 10th " | 390 | 504 | 432 |
| 9th " | 523 | 661 | 503 |
| 8th " | 648 | 543* | 582 |
| 7th " | 761 | 658* | 662 |
| 6th " | 860 | 770* | 742 |

It is unnecessary to carry the table further down through the building, as the columns get stronger more rapidly than the loads increase. In this example, only the eleventh story columns need to be strengthened.

In conclusion, it would seem that steel-framed office buildings erected prior to 1918 can probably be increased in height one story if interior columns are strengthened in the upper two or three existing stories and exterior columns in a larger number of stories; that two stories can be added by strengthening interior columns in the upper five stories if the information as to steel quality required by the Board of Appeal is available and if foundations are good for a slightly increased load. The exterior columns, however, might require radical treatment.

Reinforced concrete buildings are more favorably placed than steel. While no sweeping promises can be made, many of them can probably be increased to the new height limit with comparatively little expense in strengthening the existing structures.

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* The column below the eighth floor has a structural core with cap above the eighth floor level, which carries the ninth floor and above, but not the eighth. The load of the eighth floor is sustained by the concrete about the column to the level of the seventh floor where it is transmitted to the steel. Similarly in columns below. The tabular figures give the capacity of the steel core.

# Plate Description

THIRD CHURCH OF CHRIST, SCIENTIST, 63d Street and Park Avenue, New York. Plates 17-21. —In designing and planning this important place of worship for the Christian Science body it was desired to give the building a character which would show it at a glance to be unmistakably a structure devoted to the service of religion, and not a bank; at the same time it was not desired that the structure should present what would generally be considered an ecclesiastical appearance, and this latter consideration rendered undesirable the use of the architectural types which are usually identified with religious buildings. The structure is therefore a highly dignified meeting house, the chief desideratum being a very carefully planned auditorium which must necessarily possess unusual acoustic properties since during certain of the services the worshipers speak from their seats, and it is desirable that the speakers be heard throughout the auditorium without being required to raise their voices to the pitch generally adopted by public speakers.

For the exterior of this structure the architects, Delano & Aldrich, have used brick and limestone, the roof being of slate and the dome of the cupola gilded. The deck upon which the dome rests is largely of glass, since the light is necessary for the interior. Within, the building is finished in light colors, the walls being painted cream color and the coffers of the acoustically treated dome covered with a blue fabric. The interior woodwork is painted white, with mahogany rails for the pews. Floors are covered with a fabricated material in a tile pattern of blue and gray. The inscriptions in the panels above and at the sides of the reader's desk are painted in gold upon the wall. In the windows use has been made of a slightly irregular, amber-tinted glass, while that in the ceiling is slightly clouded. Much of the interest of the auditorium is due to the lighting fixtures which were designed by the architects. The large candelabrum which hangs at the center, and also the side lights fixed to the walls, are of silvered metal with trimmings of crystal.

HOUSE OF HUNTER PERRY, ESQ., Atlanta. Plates 22-25.—The exterior of this house recalls the homes of the earlier half of the nineteenth century, when the use of classic forms in domestic architecture was widely popular in America, and nowhere more so than in the South. The architectural type adapts itself well to verandas and porticoes which afford shade, and it admits of fairly high ceilings, which are likewise welcome in a warm climate. The architects are Hentz, Reid & Adler.

With its clapboarded walls painted white, its blinds green, its whitewashed fence, its shrubbery, and particularly its portico with four columns with Ionic capitals, this house is essentially Southern. Within, the classical spirit prevails, but the rooms possess a charmingly homelike and informal character. The trim is painted white. In several of the rooms use has been made of carefully chosen wall paper, while in the living room the walls have been simply paneled and then painted.

THE GEORGE MARSTON WHITIN GYMNASIUM, Whitinsville, Mass. Plates 29, 30.—This structure has been planned to serve rather more than the usual functions of a gymnasium, for it contains a number of details which are generally found only in well-equipped community buildings. The structure itself has been designed by the architects, J. D. Leland & Company, in the late Georgian style.

Every possible adjunct which could add to the comfort and completeness of a gymnasium has been included. The large entrance hall has been planned to serve also as a lounge, and in addition to the desk it includes many small tables for writing and chairs and settees arranged in groups. There is also a library, and nearby are a billiard room and a room for games. The gymnasium proper has been planned with a small stage at one end, while at the opposite end is a booth for motion picture apparatus. A balcony is placed around the gymnasium, arranged with seats for spectators of athletics or motion pictures. As part of the gymnasium are the office of the physical director and his room for physical examinations; there is also a room for special forms of exercise, and in different parts of the building have been arranged the rooms which contain the lockers for men and the lockers and dressing rooms for women, complete with dressing tables and hair-dryers. The room which contains the swimming pool, like the gymnasium, is provided with a balcony, and in connection with the pool there are showers for men and women. A small laundry is also provided. The planning of the building is such that the swimming pool and gymnasium may be reached through an entrance of their own, which makes it unnecessary to use the main entrance.

THE CONFEDERATE MEMORIAL INSTITUTE, Richmond. Plates 31, 32.—This dignified and beautiful building is intended to be "a repository and exhibition place for relics, paintings and sculpture, and to serve as the final place of custody for collections of Confederate relics and data and to serve as to both exterior and interior as a memorial building for the placing of commemorative tablets and statues." The exterior of the structure is faced with Indiana limestone, the large blocks below the entablature being intended for future bas-reliefs. The walls of the lecture room have been embellished with mural paintings of the Civil War by Charles Hoffbauer.

To the original structure, of which Bissell & Sinkler are the architects, an additional museum room has been added by Baskerville & Lambert.

# EDITORIAL COMMENT

## BUSINESS AND THE ARCHITECT

EVERY architect will benefit directly by a careful reading of the article by Howell Taylor presented in the Business and Finance Section of this issue of THE FORUM. This article presents an economic view of the practice of architecture, and frankly takes issue with a destructive attitude which Mr. Taylor aptly terms "group provincialism" and which exists among a comparatively small group of architects who like to think of themselves as conservatives, whose duty in life is primarily to save the profession from commercialism.

To epitomize this state of mind it is interesting to place before architects generally several statements which have recently emanated from this group, and which are described more fully in Mr. Taylor's article. A quotation from the first of these statements refers to a diagrammatic organization chart recently published in THE FORUM. The critic says: "All very businesslike and efficient, no doubt. Commercial, yes, but this is a commercial age. At least, so some blatantly insist and many accept. Personally we don't think it half as commercial as it seems to be. We believe that there is a general appreciation that architecture is one of the fine arts and not a business, and we believe that that appreciation is growing, and we believe that in course of time there will be a demand that the architect become an architect in fact instead of in name, and that he do his work himself, and that such things as chief designers and office managers and liaison assistants will have no more place in an architect's office than they have in a sculptor's or artist's studio. If an architect can't do his own designing and his own thinking, he should give up all pretense of being a member of a profession and go frankly into business where he belongs."

The second critic of modern thinking in architecture says: "Utilitarian ends are good in their place, but they must not in building be confused with the ends of architecture. In purely utilitarian building the idea of what we call practical utility governs. In architecture all utilities are controlled by the sense of beauty, as the architect conceives beauty."

Here we have a clear expression from this "small group of earnest thinkers" which with a shrugging of artistic shoulders casts off a public trust placed upon the profession by economic conditions.

The vital question involved in all this discussion would seem to be the ultimate future of the architect. Is he to be a leader in the construction industry? Is he to be an employer, or one who is employed? If architects will not accept the economic responsibilities accorded to the profession by the amazing expansion of the business structure of this country, *others will accept this responsibility* and will supply a complete service in building construction which meets the modern needs of the public and employs the architect only as a hired designer.

Speaking in terms of a public trust, let us define this trust with exactness. In 1923 over $5,000,000,000 was invested in new building construction in the United States. Of this amount at least $3,000,000,000 was directly entrusted to the architectural profession to be wisely spent on owners' accounts.

Consider the actual position of the architectural profession, entrusted with two great responsibilities, the first by inheritance, being the preservation of æsthetic ideals in the designing of buildings and in the rendering of true service to the owner, and the second, through business evolution involving direct responsibility in the actual expenditure of vast sums of public money with an equal burden of responsibility. Who can say that either of these trusts can be administered alone today? Whoever says this tears architecture from its strengthening position in our economic structure or debases this heritage of æsthetic ideals.

All of us, every *architect* in America, have respect for the traditions of the profession, for the ideals of professional service and for the uplifting contribution to human advancement as expressed in the design of buildings which house our social and commercial activities. At the same time common sense indicates the fact that if the expenditure of billions of dollars is to be entrusted annually to members of the architectural profession, then it is imperative that this trust be wisely administered in a sound, businesslike manner; otherwise the responsibility will not long remain with us, and the architect may find himself working for a general contractor or for some new type of service organization, which, decrying the business judgment of the architect, considers itself as giving a protective service from the owner's viewpoint. Already a few such organizations are in embryonic existence, and the growth of this phase of building service is definite and in proportion to the economic failures chargeable to the architect.

Economic history has shown that no profession and no industry can stand alone without progress and without adjustment to changing conditions as the years bring economic progress. How can the profession of architecture be an exception? Why should it be an exception?

This dangerous and careless attitude of destructive criticism as exemplified in Mr. Taylor's article by the term "group provincialism" generates a slow poison which deadens the reaction of the profession, tending toward a fatal inertness, and fails utterly to realize the exact truth which lies in the opinion of the American Institute of Architects, that business is at least an important servant of architecture.

# THE ARCHITECTURAL FORUM

MARCH
1924

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HENRY BACON

1866 - 1924

The
ARCHITECTURAL
FORUM

VOLUME XL MARCH 1924 NUMBER 3

# Henry Bacon

*By* ROYAL CORTISSOZ

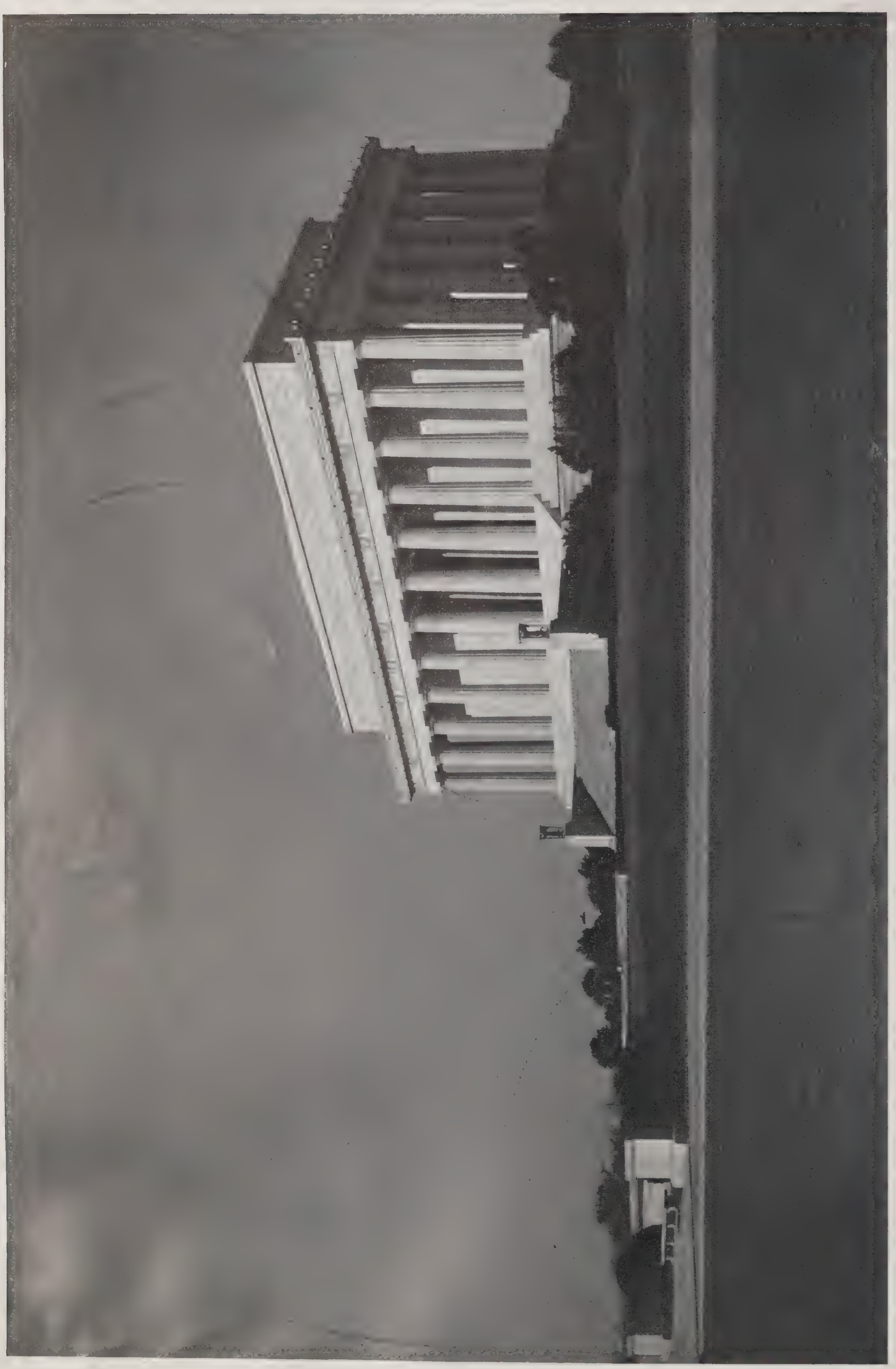
IT is impossible for me to think of Henry Bacon without thinking of the time and place of our earliest contacts. We were young together in the office of McKim, Mead and White, when that firm was doing crucial things in the revival of American architecture. I remember always, as though it were yesterday, the enkindling atmosphere created by those men and by their remarkable coadjutor, Joseph M. Wells. It had much to do with the development of a definite style, the style of Bramante and the Italian Renaissance. It had even more to do with the development of good taste and the conception of architecture as an art. Bacon was one of the men enlisted heart and soul on the side of these constructive principles.

He was so enlisted because good taste was born in him. Looking back over the thirty-odd years of our friendship I remember nothing about him more characteristic than a certain sense of measure and balance in everything that he said or did. He initiated me into the mysteries of golf, and we had countless long talks together. If they were about people, they were sympathetic and just on his part. There was nothing weak about him. You would know, somehow, when Bacon disapproved. But I never heard him say an unkind or cynical thing about anybody. On the other hand, in matters of art, there could never be the smallest doubt that he was on the side of the angels. He hated architecture that was flamboyant or slovenly, that sacrificed structural essentials to decorative flourishes.

Is there any art in which straight thinking is of more importance than it is in architecture? I put these everyday human things in the foreground, these upright and square ways of Bacon as a man, because they have so fruitful a relation to his work as an artist. Fate gave a far more diversified range to his labors than is generally realized. The Lincoln Memorial looms so grandly in his career, the climax to all that he did, that his large resourcefulness is sometimes forgotten. But with that clear, firm intellectual power of his he tackled an extraordinary number of problems. He could take the housing of a bank or a library in his stride; he knew how to design a schoolhouse or a hospital. He could even build an astronomical observatory. Yet it is not difficult to understand how at the time of his death the world was inclined to honor him just as the architect of the great temple at Washington.

Its Greek beauty carries you back to the Parthenon, but it carries you back also to the man I have endeavored to indicate at the outset, dedicated in his youth to a high ideal. The antique idiom was part of his nature, an inevitable means of expression for the traits which enriched his personality. It connotes his rectitude and his serenity, his cool judgment, his instinctive gravitation to what was pure and majestic. He saw things grandly, monumentally, and it was, again, one of the generosities of fate that brought him numberless monumental problems before he was confronted by the greatest of them all. Saint-Gaudens, French and other sculptors used to go to him for the pedestals of their statues. He made them more than pedestals. He truly collaborated with his sculptor friends and achieved the unity of design which amounted to half their battle.

There lies the point of fusion between Bacon's character and his art, in the secret of unity. With his straight thinking and his steadfast vision he could conceive of a building as a whole, vitalize mass, and use the heroic scale in such wise as to achieve not only dignity but charm. If the Lincoln Memorial is a mighty structure it is also enchantingly beautiful. There is an almost abstract sublimity about its glorious lines, yet it is one of the most personal achievements in modern architecture. Glance over the field, consider scores of the public buildings in this country designed in the classical form. They include some beautiful edifices, but despite their beauty you would characterize them as academic. There is no trace of an academic point of view in the Lincoln Memorial. It is a work of living, individualized art. Survey all of Bacon's buildings, early and late, the whole accomplishment of a rich career, and you will find in them testimony to the organic life in his genius as an artist.



Photo, Kenneth Clark

THE LINCOLN MEMORIAL, WASHINGTON
HENRY BACON, ARCHITECT

# "Arlington House"

*By* GILBERT L. RODIER

At the close of a day in May in the year 1864, (so it is related), President Lincoln and General Meigs stood under the massive portico of Arlington House, and gazed at the splendid panorama of wooded hills, river, and distant city that lay below them, and, enraptured as millions have since been by the wondrous setting of the old mansion, spoke of its owner and of the possibility of his return after the end of the war.

Meigs had been the friend of General Lee for many years and had, indeed, sympathized with the love of his native state which prompted the Confederate leader to sever his connections with the Army of the United States, to fight for the place of his birth. But over three years of cruel war had embittered him against the Southerner, and he now seized this opportunity to broach to the President a project which he had long considered, and one which would forever prevent Lee from returning to what had been his home for 30 years. Arlington had been a great military hospital, where had died thousands of Union soldiers; their remains had been buried at Soldiers' Home in the District of Columbia, at Alexandria, and in several other cemeteries near Washington, but none in Arlington. Now there was no space available except by the establishment of a new cemetery, and Meigs, then Quartermaster-general of the Army, had conceived the idea of a great National Cemetery on the estate of the Southern General. It is said that Lincoln thought long before replying to the General, and was persuaded to give his approval only when told that there were, even then, many bodies awaiting burial, and for which there was little or no room in the overcrowded burial grounds belonging to the Government in Washington. Burials were made at Arlington the following day, fulfilling as a sort of grim jest, the unintentional prophecy of Lee's daughter, who wrote to a friend in Georgia in reply to the latter's query of "Would they make of Virginia a burying ground?" the answer "Yes, but for themselves."*

The house is built of brick (I am sorry to say that these bricks were not imported from England "in ballast," but were made on the site), and the exterior is stuccoed with lime mortar. There are lines in the stucco to represent stone courses, and the jointing is well studied. The columns are also of brick, stuccoed and painted white, but the balance of the exterior, except window detail and cornices, is painted in a warm buff or ochre color. The present roof is of slate, but this is modern, as the covering was originally of wood shingles. Modern also is the metal guttering and spouting which successfully hides the crown members of the cornices, but which serves the purpose of protecting the walls.

Most familiar to the casual visitor is the great portico with its six huge columns and its heavy pediment, so like many of the early Greek temples in impression, and yet totally unlike any in detail. The wings are screened by enormous magnolias, so that the portico alone, standing a full 200 feet above the Potomac, and framed in the green of great trees, is the picture seen from Washington across the river, and this is destined to become the focal point of the axis for the Memorial Bridge leading from the Lincoln Memorial to Arlington. However, the most pleasing view of the building, and yet the least known, is that of the north wing as seen from the old garden at the side of the greenhouse. Charming also is the court formed between the west side of the house, the slave building and the old outdoor kitchen, though the great expanse of glittering concrete paving the court, which is modern, is most unpleasing and should be removed in favor of more restful lawn and simple pathways.

As to the interior design and details, the house reflects the tastes and life of its builder and owner in that it is pretentious in scale, yet simple and trite in detail—indeed, it must answer to the indictment of being "Early Victorian." In it George Washington Custis, its owner and builder, massed a wonderful collection of furniture, rugs, paintings, old books, etc., for he was a wealthy man, and his passion for possession was unlimited. There were the priceless pieces of his grandmother, Martha Washington; furnishings, china and rare portraits of George Washington, by Peale, Trumbull and Stuart; splendid works of art of all kinds, assembled during years of search and travel; in short, the place was a veritable treasure house of such things as its owner loved. To this house Custis brought his bride, Mary Lee Fitzhugh, in 1804, and amid these surroundings they reveled in dignified, splendid entertainment and simple yet stately home life for half a century.

Study of the present plan shows that there are two bedrooms on the first floor of the north wing (numbered 14 and 15), and it is known that Custis and his wife occupied these rooms after the marriage of their daughter to Robert E. Lee in 1831. But the writer is convinced, and there is every physical evidence to support the theory, that originally all of the bedrooms in the house were on the second floor, and that the space covered by rooms numbered 13, 14, 15, and the hall, Number 16, was one large dining room. All of the finish on the perimeter of this large space is exactly the same, whereas the finish occurring in the interior portions is of a totally different character. The projection in the hall (Number 16) is an old chimney breast and now serves no purpose whatever; moreover, this projection is exactly in the center of the west wall of what

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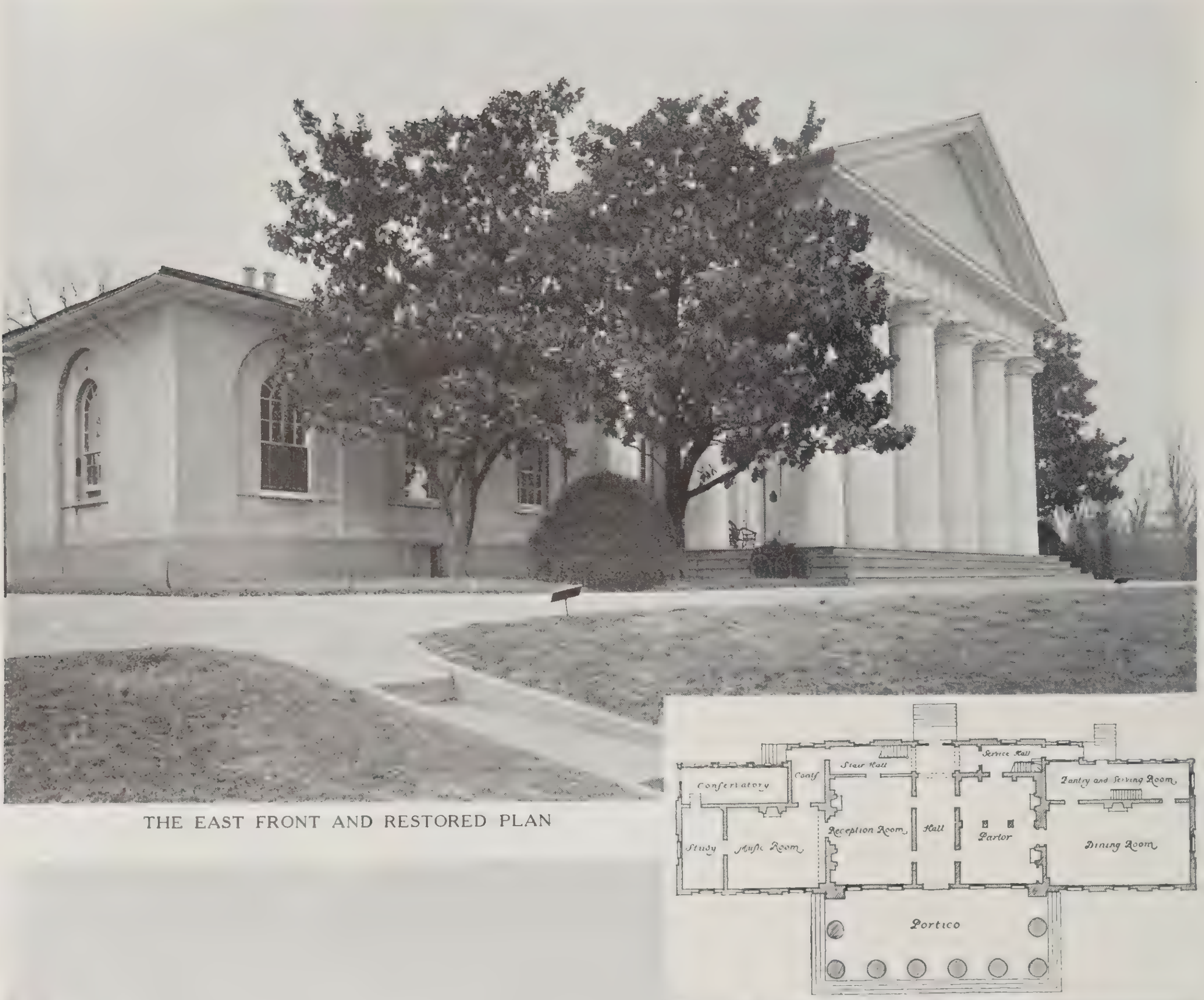
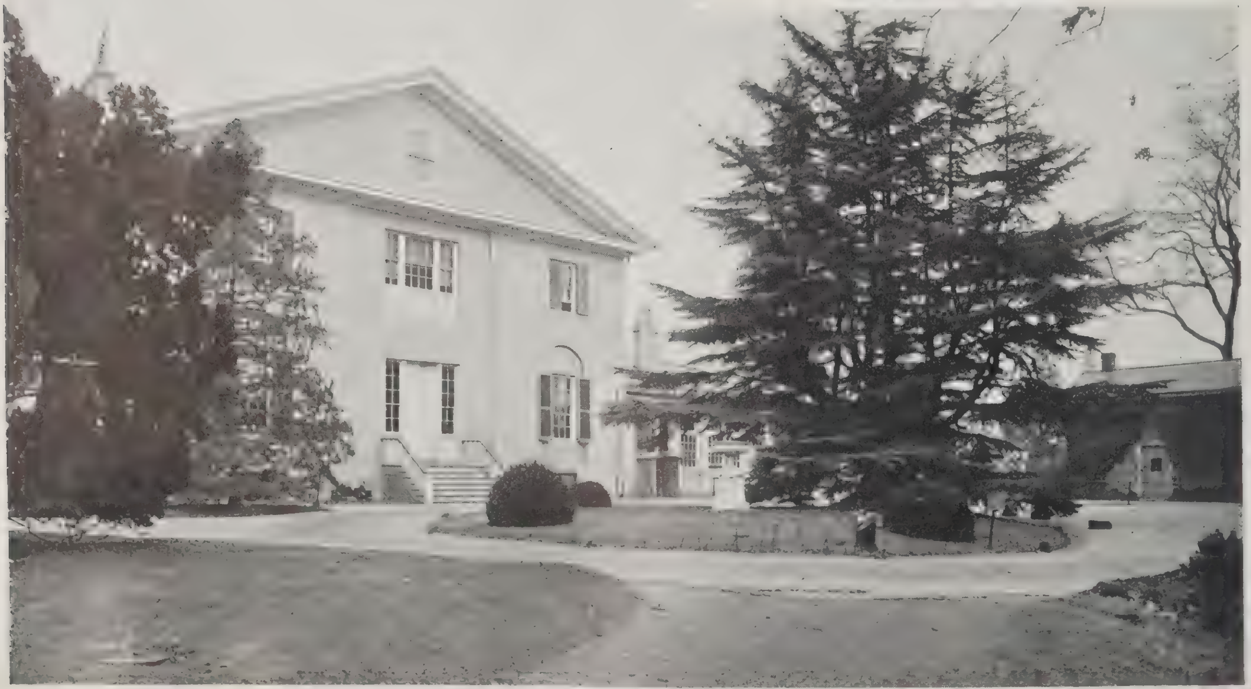
*Karl Decker, "Historic Arlington."



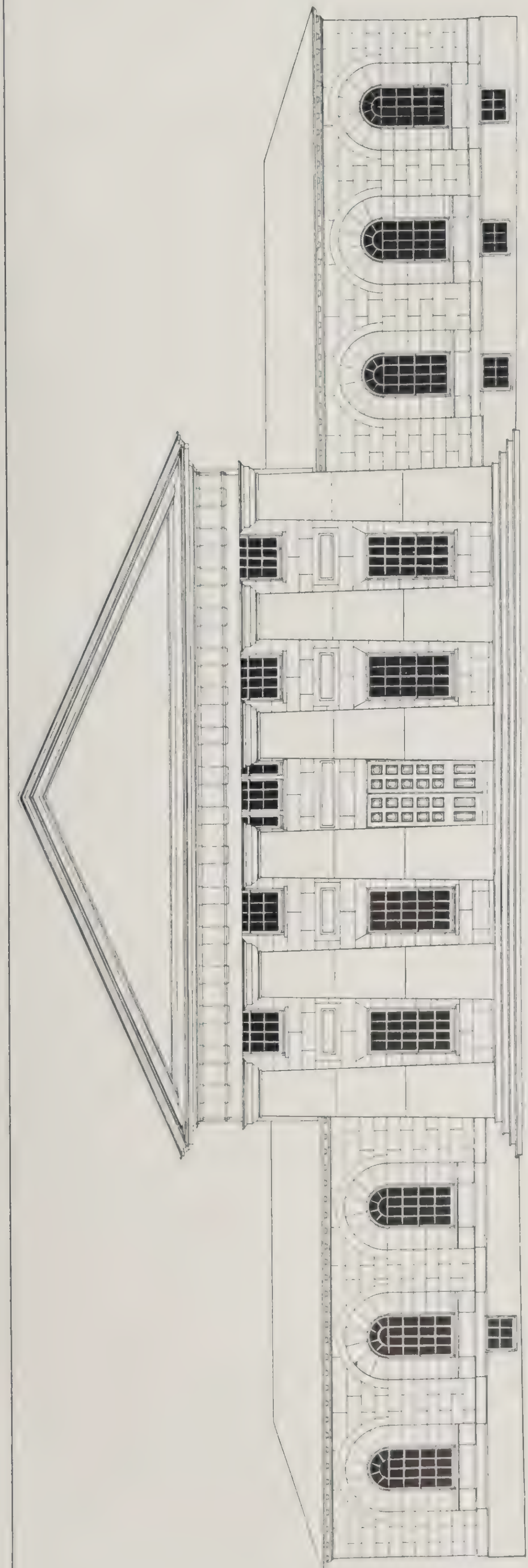
THE EAST FRONT AND RESTORED PLAN



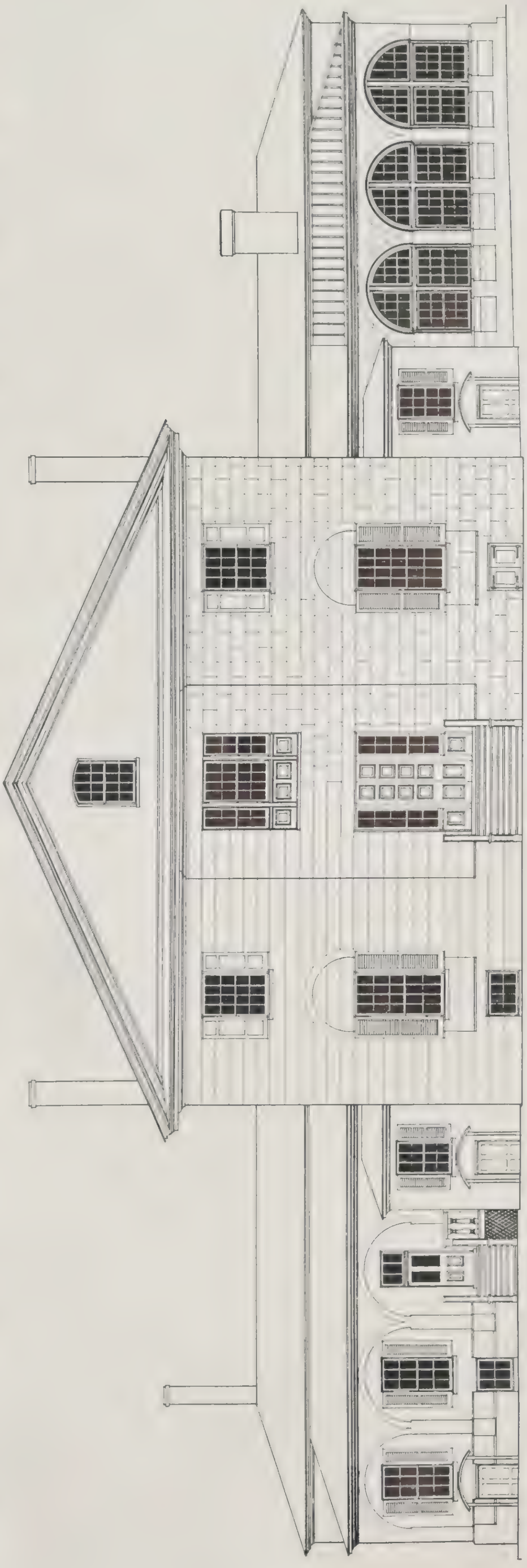
THE WEST FRONT

ARLINGTON HOUSE, ARLINGTON NATIONAL CEMETERY

*Photos, National Photo.*



ELEVATION OF EAST FRONT



ELEVATION OF WEST FRONT

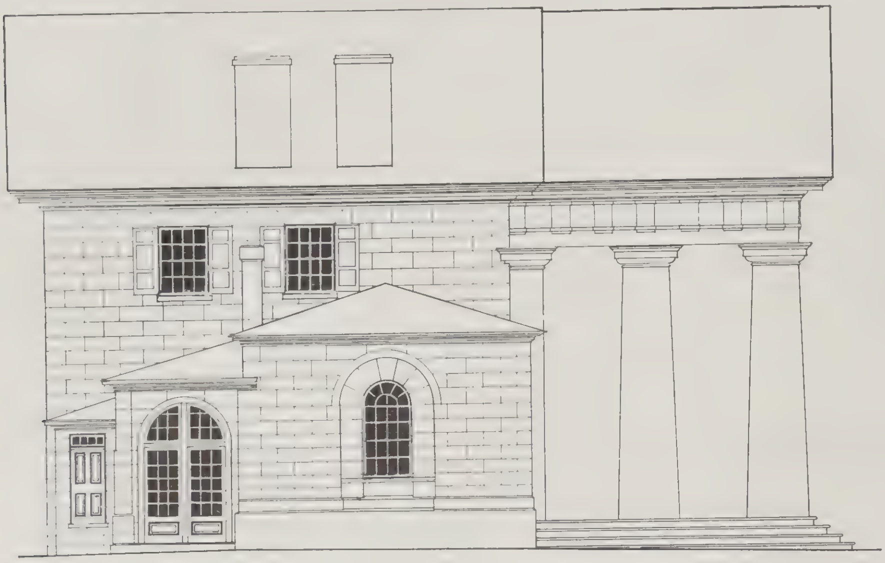
ARLINGTON HOUSE, ARLINGTON NATIONAL CEMETERY

Scales: 1/16" = 1' 0"

seems to have been the original dining room, and doubtless this was the fireplace. It is believed that the beautiful wooden mantel now in Number 14 was formerly used for this fireplace, it being entirely out of scale in the room where it is now placed. The relation of this space to the outdoor summer kitchen and to the basement kitchen also forms a logical basis for this theory, and on the sketch plan illustrated with the exterior views is shown what is believed to have been the original layout for the first floor. Every consideration indicates this.

In April of 1861 Lee, having returned from service with the army in Texas, where he had been during the several years of turmoil preceding the war, wrote his resignation from the United States Army, at Arlington House. On the 22nd his family fled to Richmond, and the following day he accepted the command of the Confederate Army. Within less than a week the house was occupied by a portion of the troops then feverishly building a ring of earthwork fortifications around the capital. The contents of the house were completely scattered, some pieces being taken by the Government (now in the National Museum), some finding their way into the hands of the Lee family and to Mount Vernon; but much taken by soldiers and peddled in the streets of Washington. And from that day the famous old house has been bare and empty; the entire north wing and the second floor are barred to the public, as they are occupied by employes of the cemetery. Visitors are shown through two empty, desolate rooms, the least interesting of all, historically and architecturally speaking, but only these rooms can be seen by visitors to the house.

But fortunately the National Commission of Fine Arts has become interested in the old building, and it is to be hoped that the day is not far distant when it may be restored to a semblance of its original splendor, the cemetery employes moved to new and more suitable quarters, and the entire house opened to visitors so that they may carry from Arlington a true impression of what the noble old structure was like in its grand days before the Civil War.

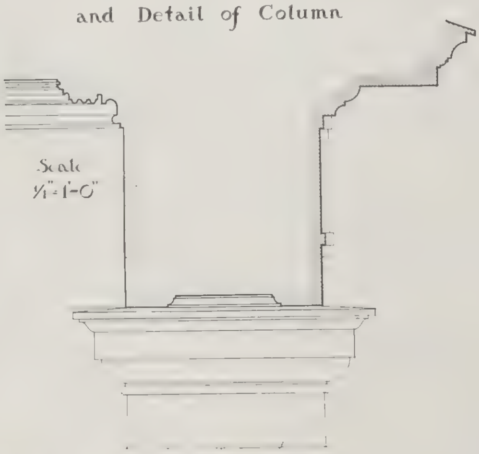


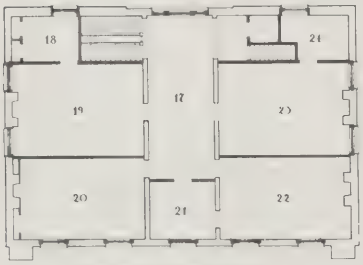
North Elevation

Scale of Elevation: 1/16" = 1' 0"
Scale of Plans: 1/32" = 1' 0"

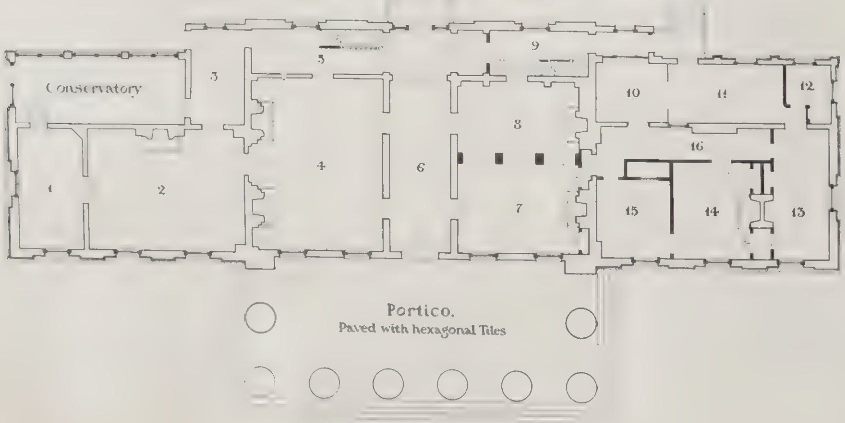
Measured Drawings by Rodier & Kundzin, Architects

Section thru Main Cornice and Detail of Column



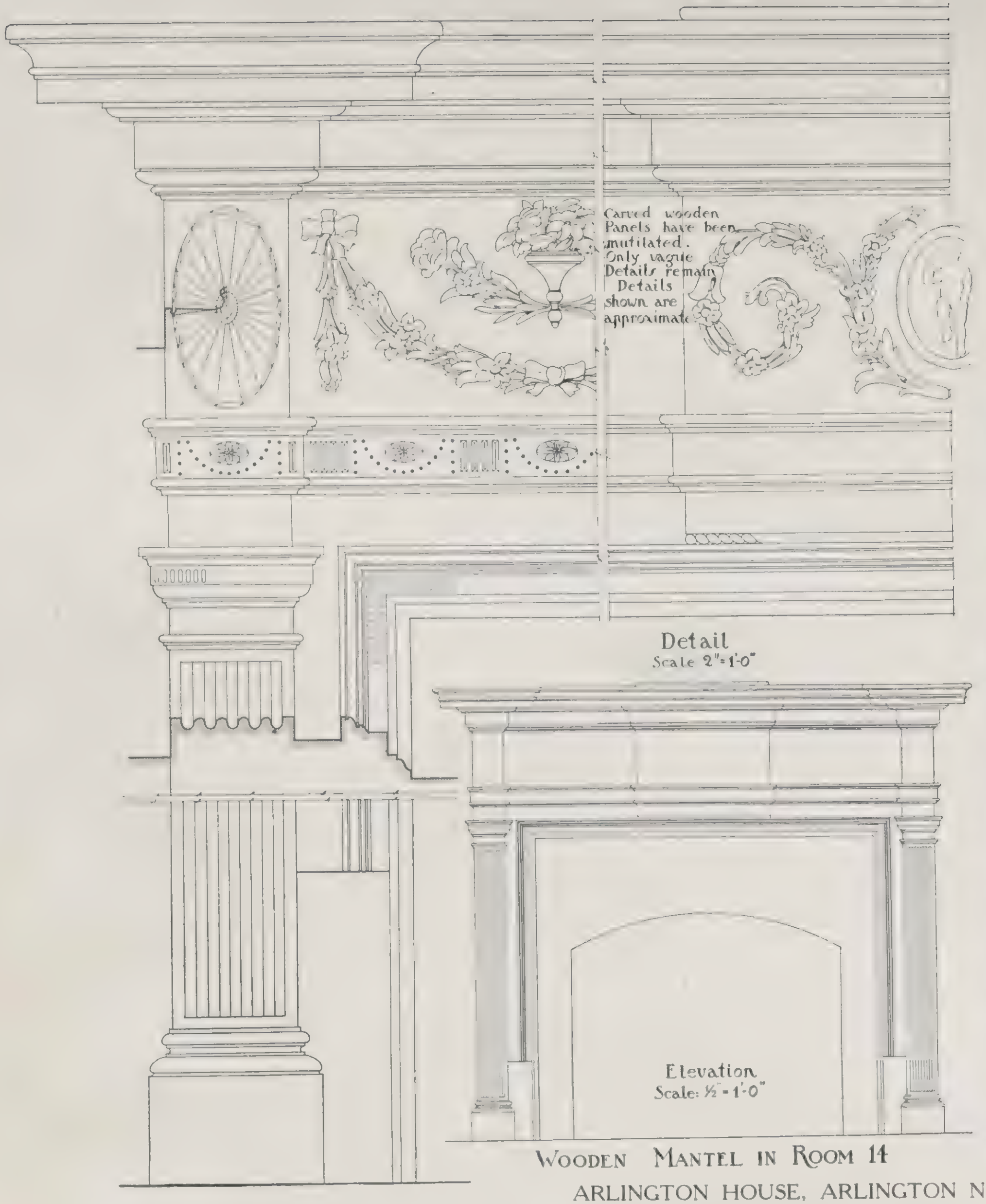


Second Floor Plan



First Floor Plan

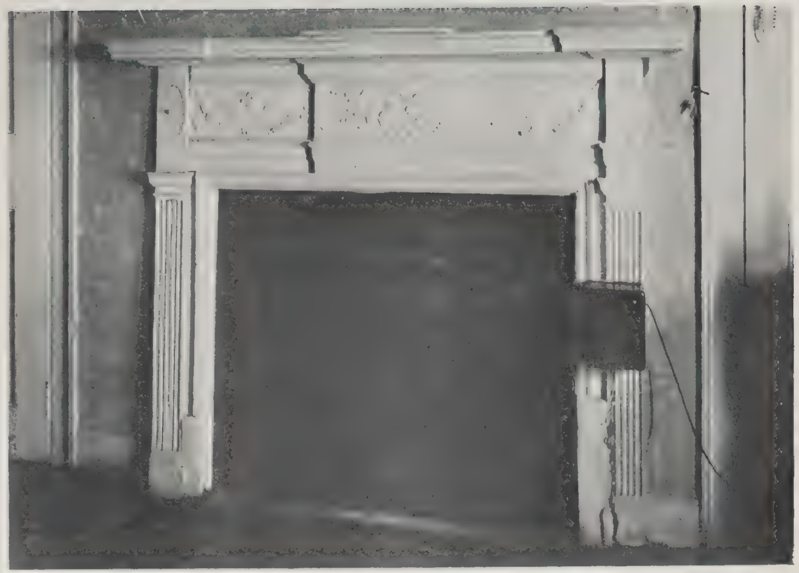
Arlington House, Arlington National Cemetery


Carved wooden Panels have been mutilated. Only vague Details remain Details shown are approximate
Detail
Scale 2"=1'-0"
Elevation
Scale: ½=1'-0"

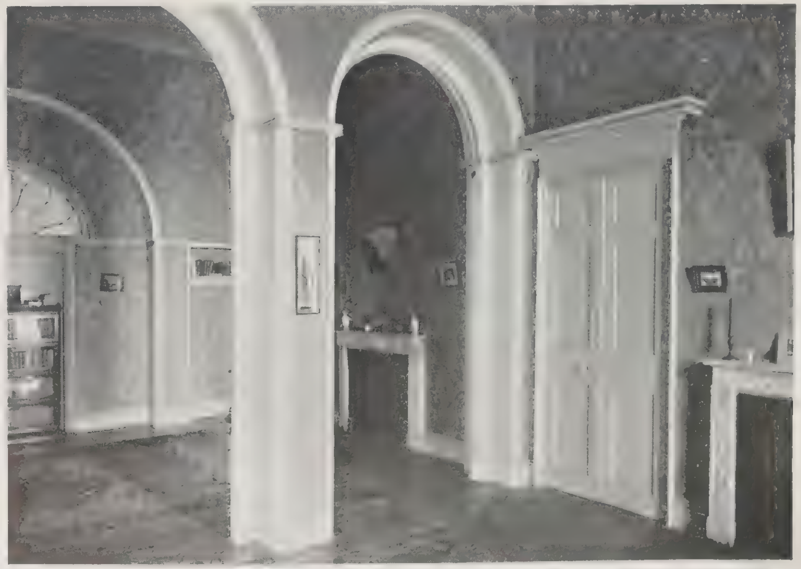
WOODEN MANTEL IN ROOM 14

ARLINGTON HOUSE, ARLINGTON NATIONAL CEMETERY

MEASURED DRAWINGS BY RODIER & KUNDZIN, ARCHITECTS

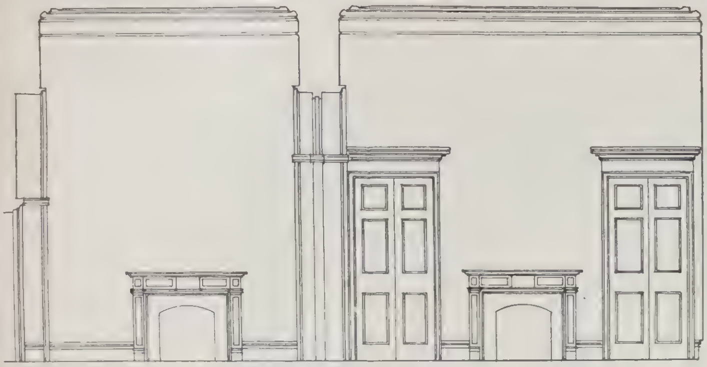


DETAIL OF WOODEN MANTEL IN ROOM 14

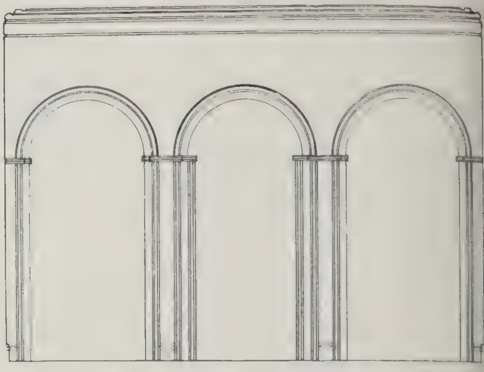


ARCHES BETWEEN ROOMS 7 AND 8

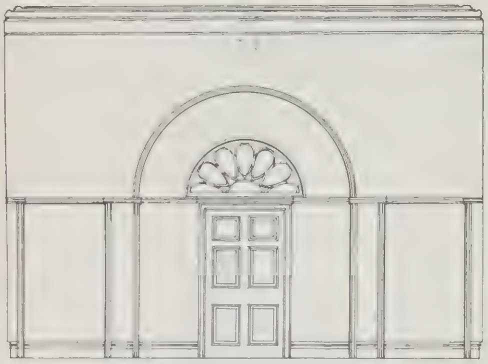
# ELEVATIONS AND DETAILS OF ROOMS 7 & 8



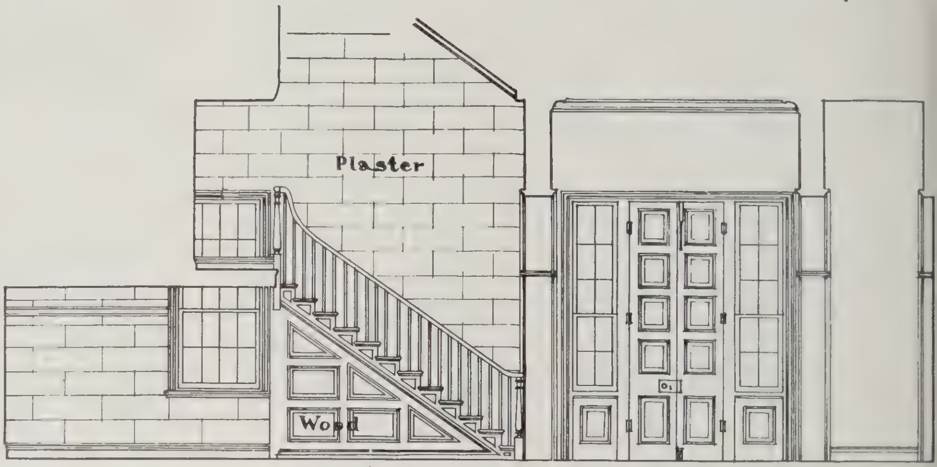
8. North Side. 7.



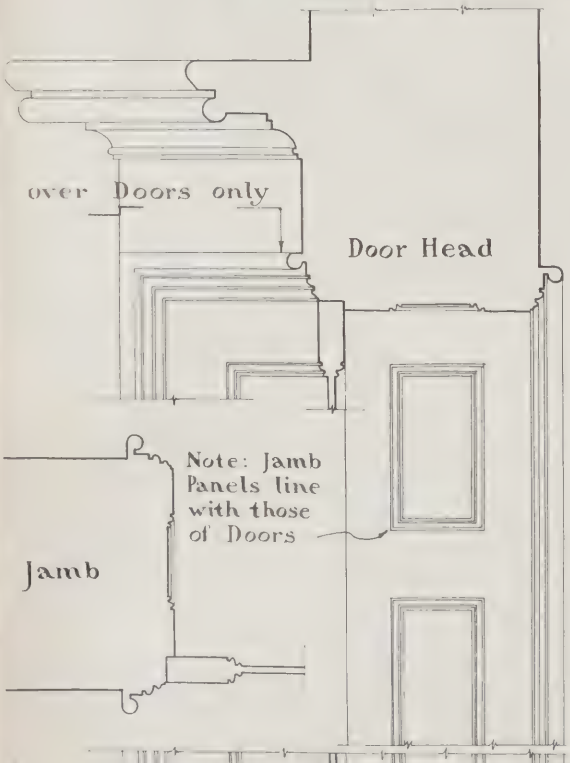
Arches between 7 & 8.



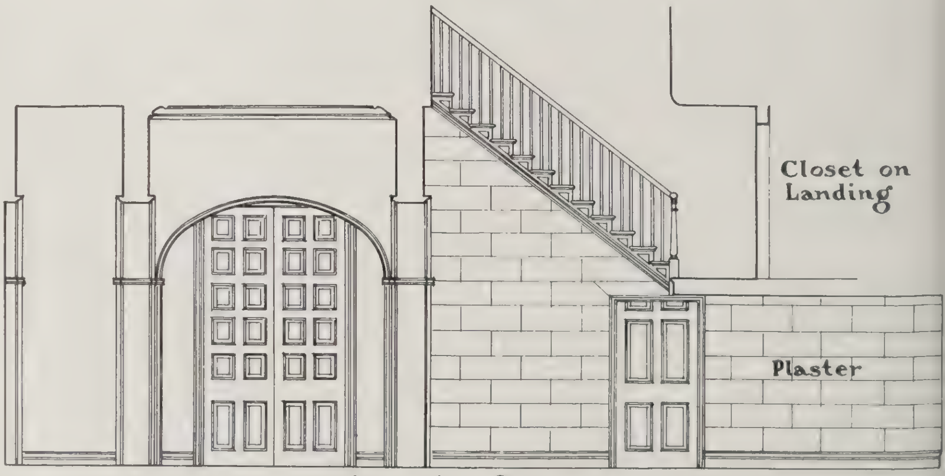
West Side.



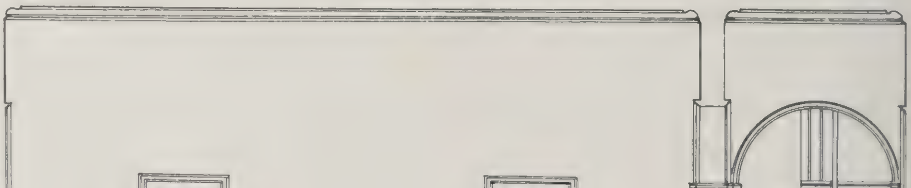
West Side



DOOR IN ROOMS 7 AND 8
Scale: 1" = 1' 0"

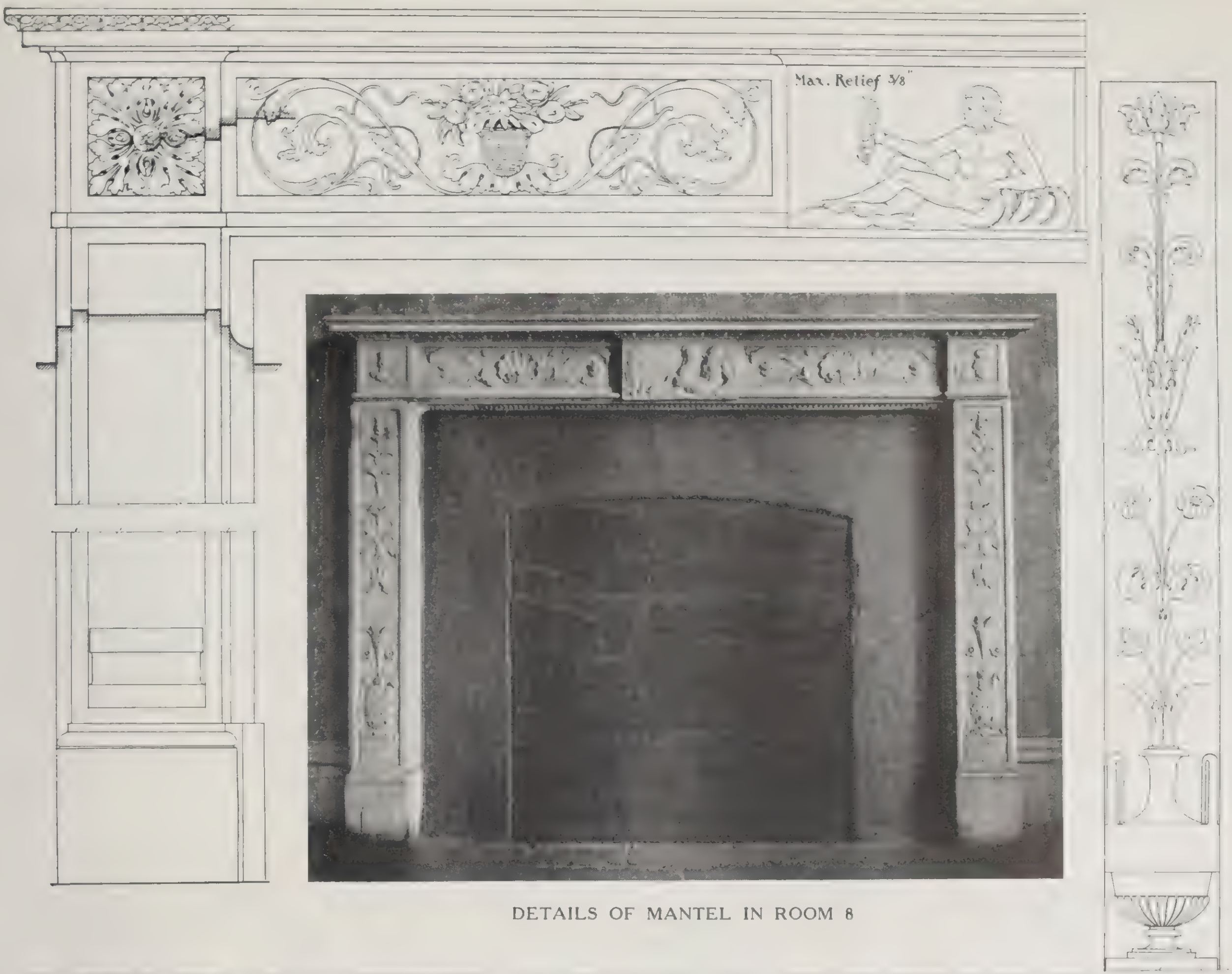


East Side

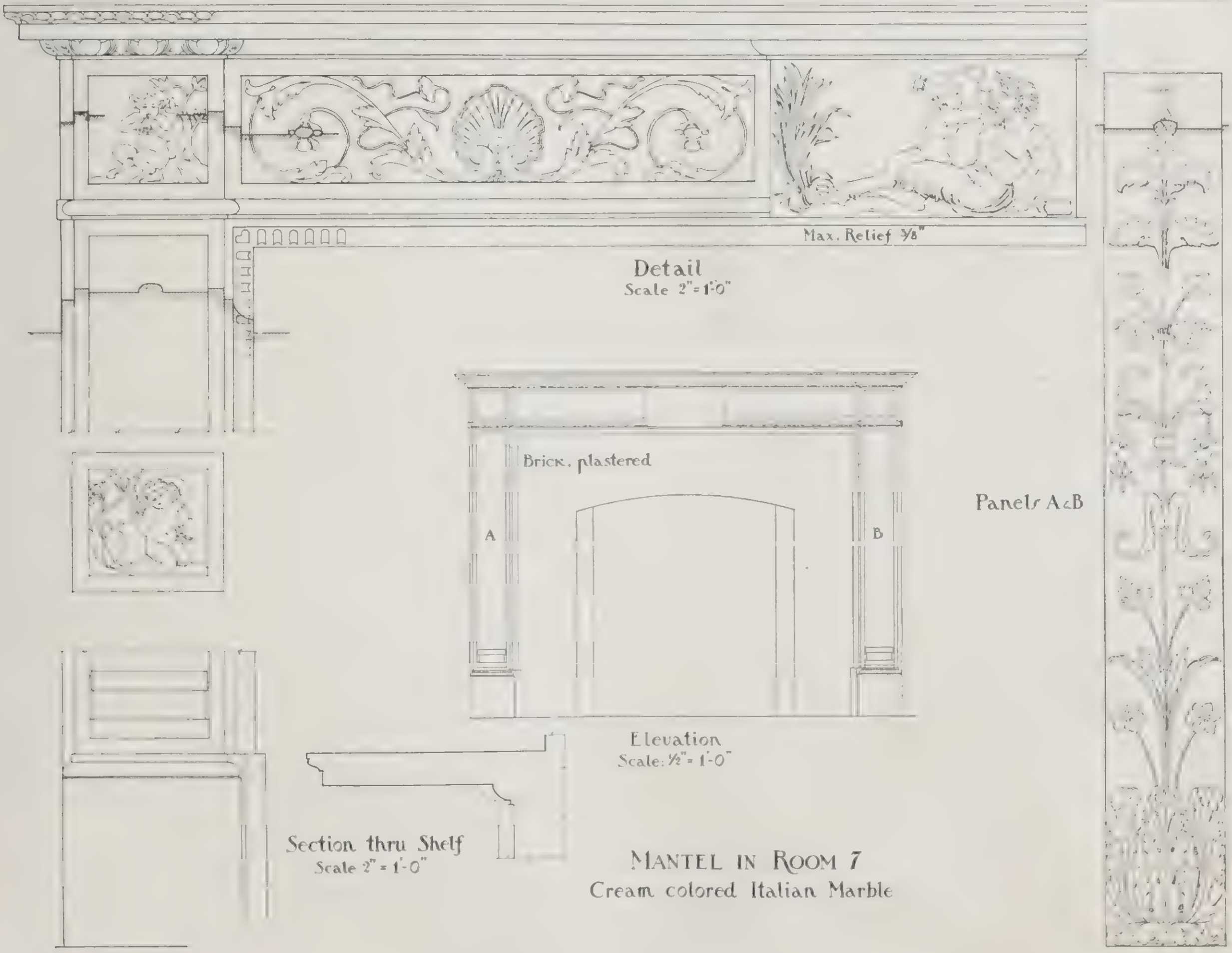


SOUTH SIDE
ELEVATIONS OF HALL
Scale of All Elevations: $\frac{1}{8}$" = 1' 0"

ARLINGTON HOUSE, ARLINGTON NATIONAL CEMETERY
MEASURED DRAWINGS BY RODIER & KUNDZIN, ARCHITECTS



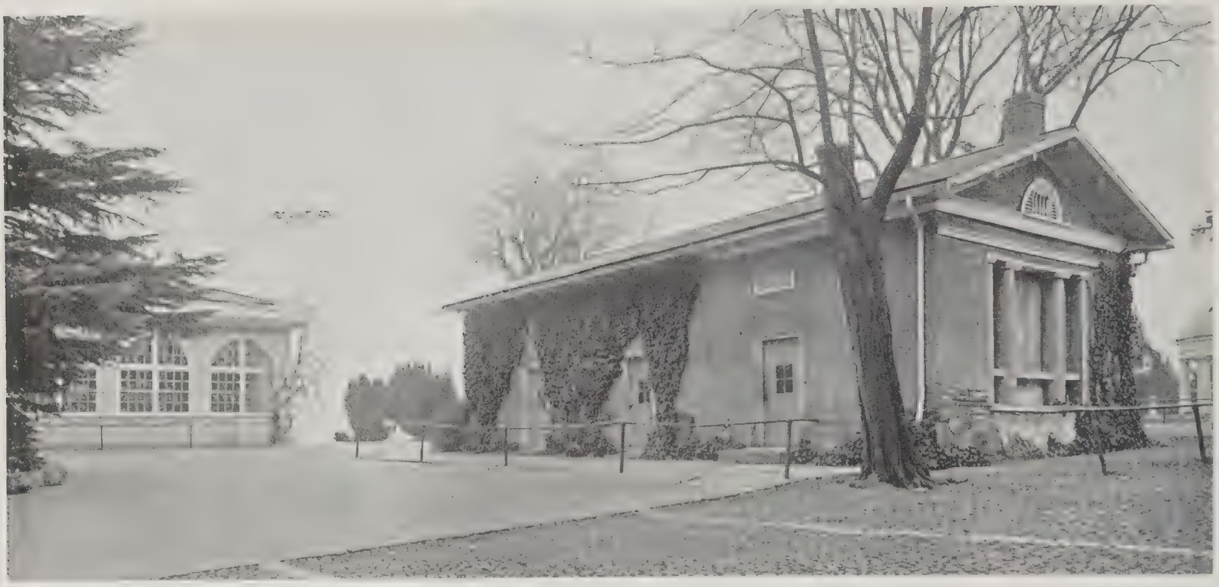
DETAILS OF MANTEL IN ROOM 8



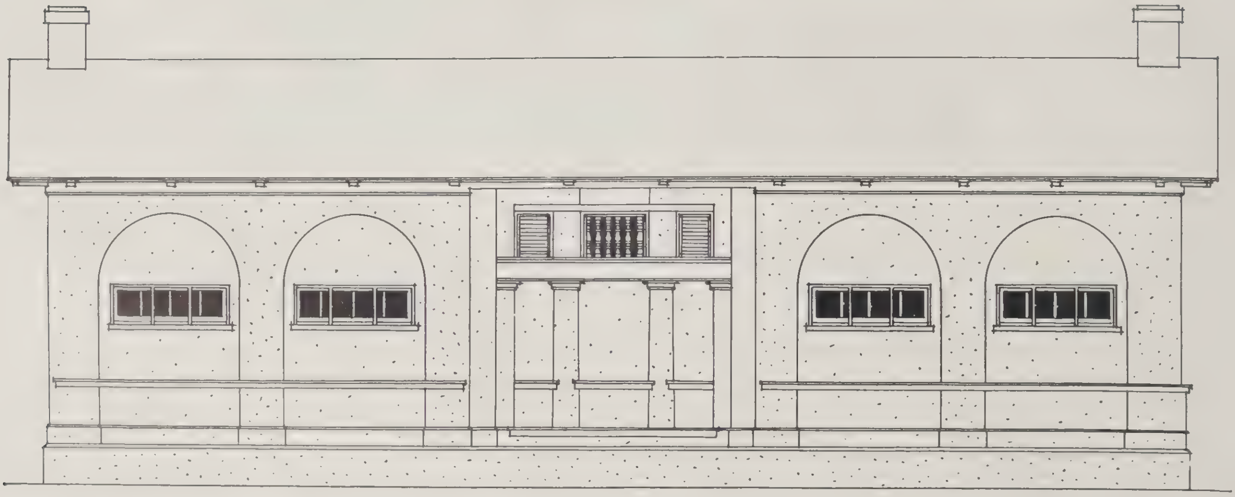
MANTEL IN ROOM 7
Cream colored Italian Marble

## ARLINGTON HOUSE, ARLINGTON NATIONAL CEMETERY

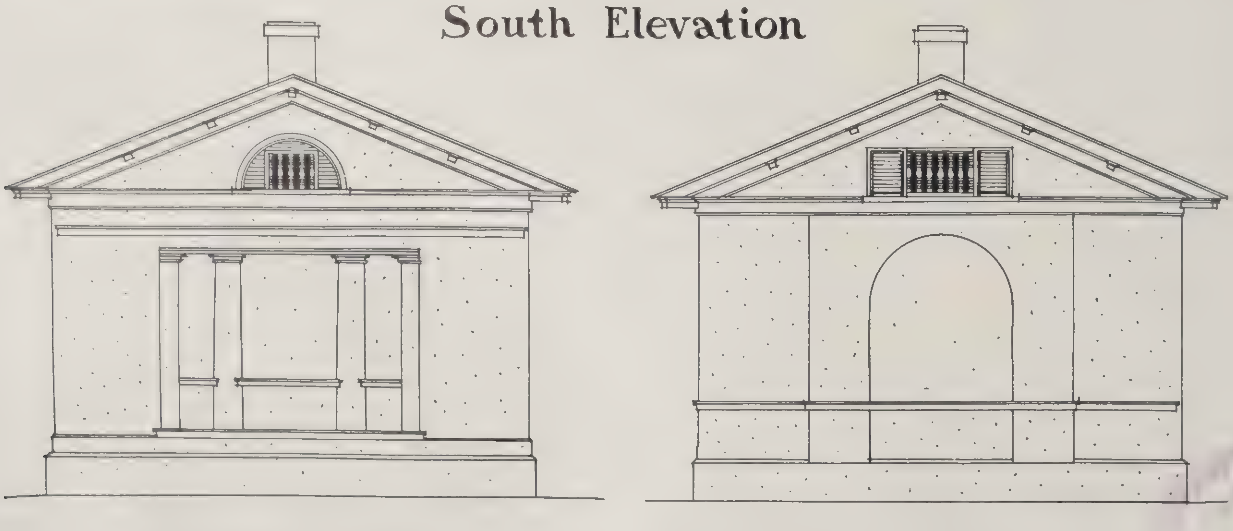
MEASURED DRAWINGS BY RODIER & KUNDZIN, ARCHITECTS



COURT OF WEST FRONT, SHOWING SLAVE QUARTERS



South Elevation



West Elev.

East Elev.

Scale: ⅛″=1′ 0″

ELEVATIONS OF SLAVE QUARTERS

ARLINGTON HOUSE, ARLINGTON NATIONAL CEMETERY

MEASURED DRAWINGS BY RODIER & KUNDZIN, ARCHITECTS

# Greek Letter Fraternity House Architecture

*By* OSWALD C. HERING

A CURIOUS phenomenon which came to my notice some time ago possesses features of unusual interest both to the architect and to the college man who is initiated into a Greek letter fraternity. It is the almost total absence of any expression of the character and ideals of these fraternities in the architecture of their chapter houses. It would be more fitting, perhaps, and more accurate, if I limited this statement to the houses built or bought by my own fraternity, as I am naturally unacquainted with the rituals of our friendly rivals. At the same time, I may say that I have seen but few fraternity houses whose facades exhibit any distinctive characteristics, other than those which are associated with the residence or the dormitory.

Architecture invariably expresses the habits and customs of a people and the conditions under which they live. For example, an era of great physical and intellectual perfection in the human race reigned in Greece, about 400 B. C., when the art of architecture reached its highest state. Consequently, a Greek letter college fraternity, whose ideals are as lofty as current thought is capable of conceiving, may today consistently employ Greek architecture, in America, (modified to suit local conditions) in a building to be used as its chapter house and lodge. That is not to say, however, that it should be of Greek design, if it forms a unit or part of the general plan of the college, when that happens to be Tudor.

When an architect is given the job of designing a church he generally evolves something that people who enter it, or walk by it, recognize as a place for religious worship. And the same is true, or should be true, of other characteristic buildings. Why, then, has the architectural problem of the college fraternity been so generally overlooked or ignored by our architects? For, generally speaking, the best examples of architecture erected in the past 20 years are seen in America. I have not been in Paris for 12 years, but between the time I left the Ecole des Beaux Arts, in 1899, and a brief visit in 1912, I saw few new buildings that were worthy of praise. With the exception of the two exhibition buildings erected for the Exposition of 1900, the Grand and Petit Palais, and the Pont Alexandre Trois, there was nothing that had been done which could be dignified by the name of architecture. Similarly, in Rome, filled as that superb city is with the still glorious remains of an ancient art, to inspire the architect, the two newest edifices—the Palace of Justice and the Victor Emanuel Monument—may safely be ranked among the greatest architectural atrocities of the world. Where had the genius flown to, that in the great school of architecture in Paris, had, in my time, conceived such brilliant projects? Apparently it had flown to America. For nowhere in the world, during the past decade, can there be found so many architectural masterpieces as have been wrought by American architects in their own country. And so, as I have said, it astonishes me that a field, so exclusively American, so absorbingly interesting, so fraught with wonderful possibilities and so stirring to the imagination as the Greek letter fraternity house, has apparently escaped the attention both of the laymen and architects of this country.

Most of the chapter houses of my fraternity, Delta Kappa Epsilon, have been bought ready made. They are either city, suburban or country residences. It may be said, as an excuse for the acquisition of such houses, that there was not enough money at hand to build chapter houses of a suitable character, with individuality, that would fulfill the requirements. But with sufficient funds, it is to be deplored that in some instances costly residences, lacking in character and good taste and wholly out of keeping with the spirit and traditions of ΔKE have been acquired by well meaning but ill advised or thoughtless alumni; and where new houses have been built, there is not a single instance that I know of in which the building committee has required, or its architect designed, a chapter house wholly in terms of ΔKE.

One of the cardinal principles of good architecture is that the facade and plan shall express in unmistakable terms, easily comprehended by people of average intelligence, the purpose of a building. Let me illustrate by citing a few buildings, for example, in Washington. There is scarcely a person of higher origin and education than a Fiji Islander who, standing before the Capitol, would fail to comprehend the meaning and purpose of that structure. The Capitol is unmistakably a government building. Likewise, the White House is assuredly the residence of a high government official. The Washington Monument could mean nothing but a memorial of some great personage, nor could the Union Station be anything but a railroad station. Whoever has visited the Masonic Temple of Scottish Rites must have been deeply impressed with the beauty and dignity of this noble edifice, and no one could escape the consciousness that in this building occur the solemn rites of a secret order.

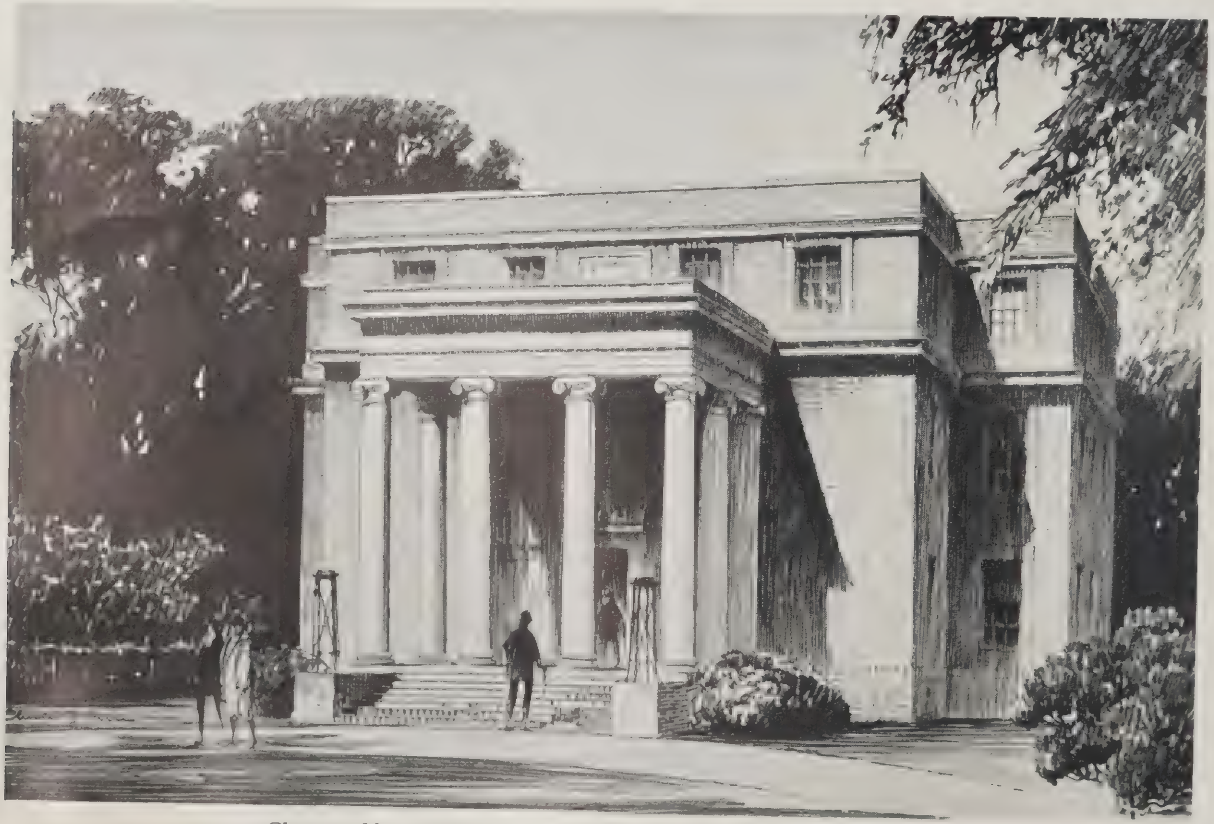
One of the first duties of building committees of future chapter houses is to consider the importance, nay, the necessity, of requiring the architect to design a house that shall have stamped upon its facade and impregnated in the interior atmosphere, the unmistakable fact that it is the dwelling and meeting place of members of a secret and fraternal order. To accomplish this requires little or no additional money over and above the sum needed to build a structurally sound and well designed house.

Just consider for a moment what a truthful expression of the purpose of a fraternity house, in terms of architecture, would accomplish. One of the most poignant moments in your life, a moment when you are lifted into the seventh heaven of relief and joy, is when the bandage is removed from your eyes and the consciousness surges through you that, at last, you have been received into your fraternity. Yet I have been present at initiations in a number of chapter houses—my own included—and with the exception of a few houses which have lodge rooms worthy of the name, what is it that greets the first glance around the room of the newly ordained Deke? Often it is the familiar form and appurtenances of the typical boarding house parlor. And during four of the most formative years of this young Deke's life, when his tastes are mostly acquired, he is forced to live in surroundings that are generally no better than rooms in an ordinary lodging house. To the commonplace environment that is the heritage of most young Americans (and the lodging house is no worse, in this respect, than the house of the uncultivated nouveau riche), is due in a large measure the low average we Americans hold, among the nations of the world, in matters of taste in art and the understanding of it. Many Americans want good art, but few can pick it with any degree of assurance. We generally hire someone to do that for us. The chapter house, intelligently designed and tastefully furnished, will generally do more than anything else to cultivate good taste in the undergraduate fraternity member.

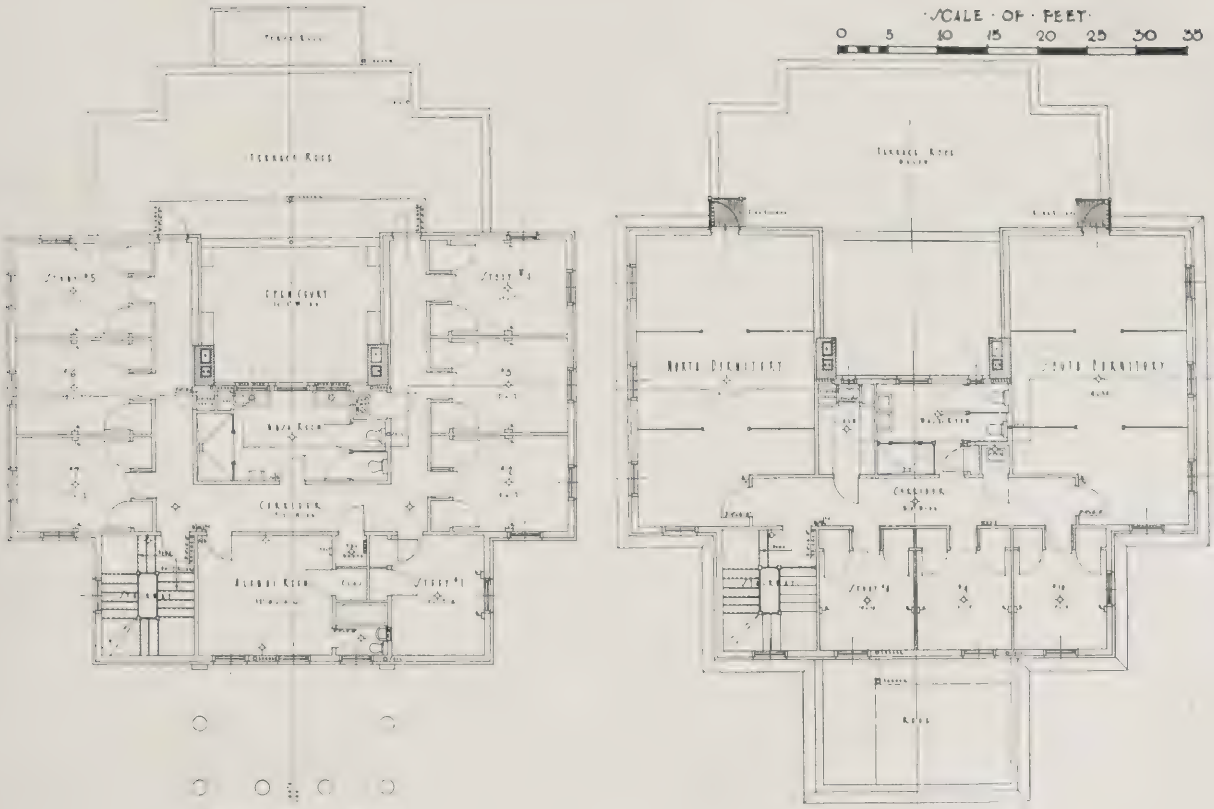
The weekly literary exercises, which most of the chapters have, or should have, would be a hundred times more impressive if they were held in a room with an atmosphere of privacy, dignity and mysticism, instead of in the front parlor—the usual meeting room of some of our houses. This room as a rule has little privacy, and with its miscellaneous collection of early Grand Rapids furniture, department store bric-a-brac, and hand painted photographs, is anything but inspiring.

It should be borne in mind, in building chapter houses, that any scheme which provides ultra conveniences and luxurious appointments cannot be too strongly condemned. To accustom a young man, who has lived in surroundings of a modest character, to a life of ease and affluence, and then turn him out at the end of four years, with the prospect of living in a hall bedroom of a rooming house, is nothing less than cruelty. More harm than good is done, not only to the individual, but to the character and reputation of the chapter, in providing a setting that invites a soft and easy-going college life. A logical consequence will be that the young occupants are either spoiled, or that they are taxed for the upkeep to such an extent that only rich men's sons may enjoy its privileges. This is wholly foreign and contrary to the underlying democratic character of most fraternities.

Every fraternity building should, if possible, be fireproof, of sound and durable construction,

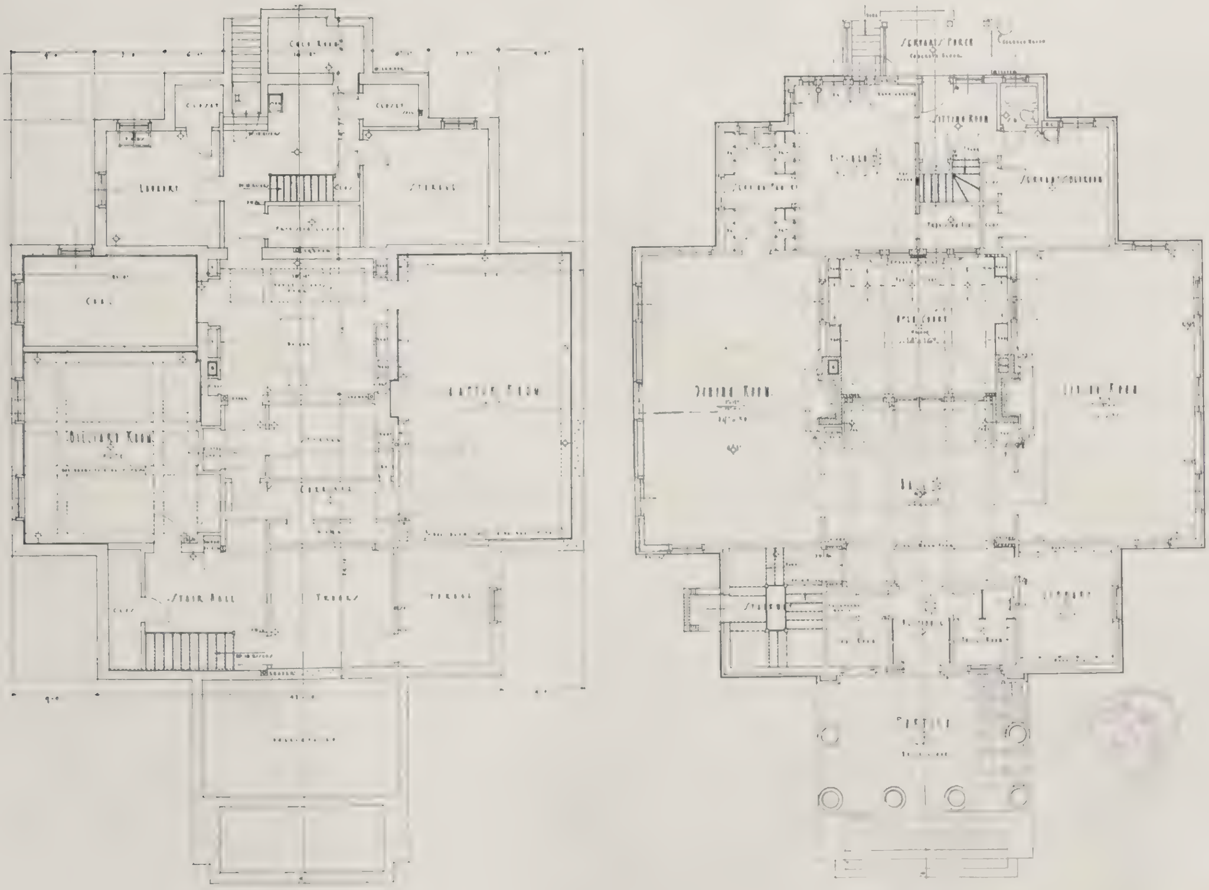


Chapter House, Delta Kappa Epsilon Fraternity, Troy, N. Y.
Oswald C. Hering, Architect



SECOND FLOOR PLAN

THIRD FLOOR PLAN



BASEMENT FLOOR PLAN

FIRST FLOOR PLAN

CHAPTER HOUSE, DELTA KAPPA EPSILON FRATERNITY, TROY, N. Y.
OSWALD C. HERING, ARCHITECT

equipped with reasonable time-saving, money-saving and health-insuring conveniences. Its decorations should be simple and in good taste, using, for example, flat covered stenciled surfaces rather than elaborate plastic ornament in relief. The furniture should be substantial and comfortable, and the general atmosphere one of quiet, dignified, refinement, with a touch of the mystic that will inspire, in the fraternity man, a respect bordering upon reverence for his college home and be a magnet that will draw him back to his Alma Mater by the irresistible forces of pride and satisfaction.

No architecture could be more appropriate for a Greek letter fraternity house than the architecture of ancient Greece. But where the college authorities have already an established plan in a certain style, it may be necessary to conform to that style. For example, if a quadrangle of dormitories and fraternity houses has already been started in the Colonial or the Tudor style (the architecture most commonly used for new college buildings in America), the design for the fraternity houses must necessarily harmonize with the style already adopted. A fraternity house can be made to portray its purpose in any style of architecture, although greater ingenuity on the part of the designer may be required to interpret it, for instance, in the Tudor style than in the Greek style.

Especial care and consideration should be given in planning a fraternity house to have it compact, with a minimum of waste space and other extravagances, for the money which builds these houses is usually secured by passing around the hat among the alumni. In the building pictured, two notable economies have been secured by the substitution of plaster wall board for plaster, and by providing two fully equipped closets for each of the combination study-and-dressing-rooms, thus eliminating the need of two bureaus in each of these rooms and saving the cost of the space they would occupy. The men sleep in the cubicles on the top floor, bathe in the wash-rooms, and then go to their studies—which are also their dressing rooms. Each dressing room closet is equipped on one side with a series of superimposed tills, which hold more than the contents of a bureau and allow the articles of wear to be kept separate and always in view. On the other side of the closet is a rod, with hangers, for clothes. A full-length mirror on the inside of the door completes the equipment.

The dormitory system of sleeping quarters, the study-and-adjacent-bedroom arrangement, and the combination bedroom-and-study, all have their enthusiastic supporters, although the last named is the least popular. There are many arguments in favor of the dormitory, especially when it is divided into cubicles. And these arguments often begin, and end, with the evidence that the dormitory plan costs about a third less than the study-and-adjacent-bedroom plan, which is a potent argument.

The dormitory system came to us from the English schools. It has the advantage not only of securing a great saving in space,—and consequently in cost,—since four men can be accommodated in a dormitory in the same space that is taken by two men in a bedroom, but the dormitory insures better health of the occupants, since the larger room contains a greater volume of air and more windows, guaranteeing better ventilation. The dormitory tends to raise the standard of scholarship, for it is difficult for several boys to sleep and study in one room or in adjoining rooms without interruption. When the dormitory is on one floor and the study room on another, regular sleeping and study hours can be maintained without disturbance. Discipline and general morality are improved with the dormitory system. When a couple of boys lock themselves in a bedroom, they can drink, gamble and deport themselves in ways they would not venture to do in public. In a dormitory everyone becomes more or less acquainted with the conduct of his mates, and if a man gets drunk night after night, or stays out all night, it is known not only to his roommate but to practically everyone in the chapter. This deters men from wrongdoing, for there are always a number of men who have a sense of obligation to others, and the seniors in particular are able, under a dormitory system, to keep an eye on their younger brothers and help them when they show an inclination to stray from the beaten path. The dormitory system has a further beneficial effect on the men—because it is democratic. It puts all men on the same level, and each one gets acquainted with the others, which is not always possible when the men live, study and pass their time in separate rooms on different floors.

The objection sometimes raised to the dormitory is the natural hesitation to adopt a new plan unlike that which may exist in other houses. For in social matters, college boys are the most conservative creatures in the world. Often, too, the seniors do not like to be put on the same level with the freshmen—and finally, all men desire privacy to a certain extent, and some are so constituted that they always like to be alone, except when it is necessary to mingle with the crowd, as at meal times and at meetings. But with the dormitory divided into cubicles, and with separate study rooms to accommodate one, two, or more men as agreed, most of these objections are overcome.

The perspective is purposely shown almost in a full front view, so that the entrance portico and the tripods, flanked by unbroken walls, should stress the Greek motif and the mystery. The other three facades are liberally punctured with windows (as the floor plans show) stressing the domestic character of the building, which could be still further accentuated by window blinds. The tripods, on either side of the entrance, are intended, upon nights of initiation, banquet, or important occasions, to be filled with oil and lighted, as an indication that a special event is transpiring within.

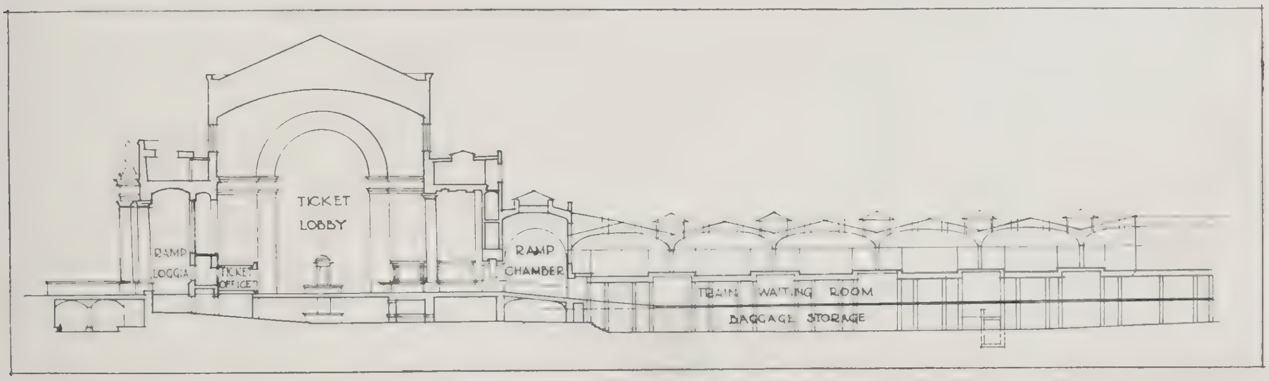
# The Union Station, Toronto

ROSS & MACDONALD AND HUGH G. JONES, ARCHITECTS
JOHN M. LYLE, ASSOCIATE ARCHITECT

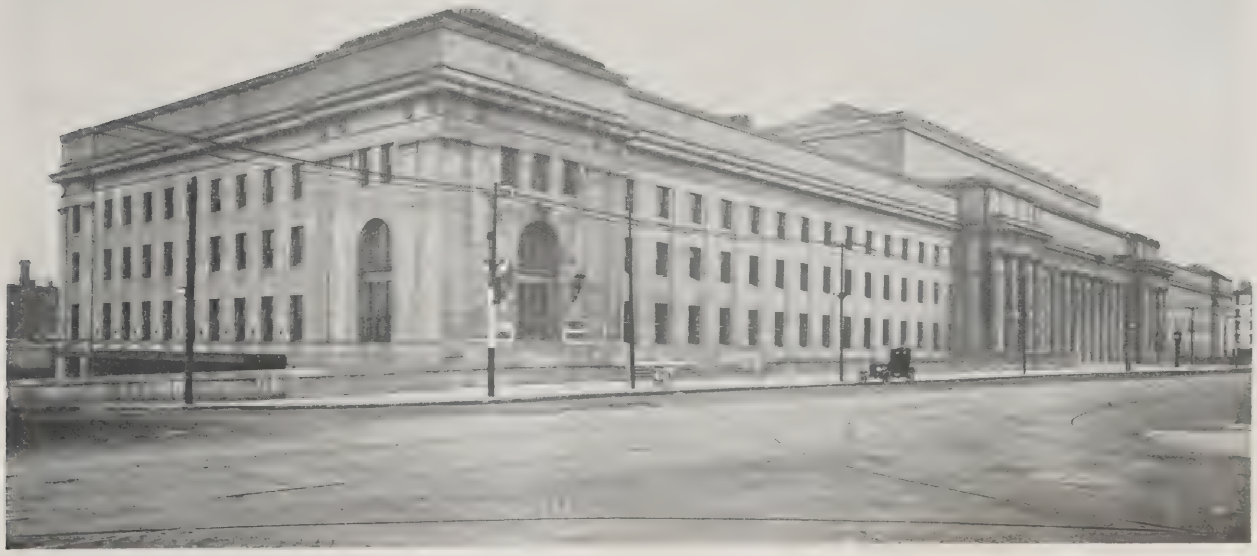
THE construction of this building was begun in 1915. The portion illustrated was completed in 1920. The post office and office wing are now in use, but the station itself is not, owing to a lack of agreement between the city, the harbor authorities and the terminal company, which has resulted in delaying the construction of approaches and station trackage. As originally designed, access to trains through a train waiting room under raised tracks was intended. At the time construction was begun, however, changes were made in the plans of the station making it workable with either high or low level trackage. A number of alternate plans for track platform access are now under consideration. That illustrated is the original plan, showing the under-track train waiting room.

The areas shown are based upon a very careful study of the relation of space to business handled at other terminals doing a similar business. The daily business at the old terminal for the year 1913, when the new station was planned, was approximately: through trains, in and out, 130; loaded cars, 1,000; baggage (pieces) 10,000; parcels (pieces) 1,500. The Pennsylvania Station, New York, 1921 figures indicate 181 through trains per day. The Grand Central, 1921 figures indicate 133 through trains per day. The baggage business here is rather heavier than at either of the New York stations. While there is no suburban business at Toronto, the peak passenger business at exhibition time in August of each year is very heavy, and made necessary the provision of large station areas and the separation of in and out passengers.

The effort in planning was, as far as possible, to arrange all portions of the station in such sequence as to allow passengers to transact their business and pass to or from trains with a minimum of cross traffic current or retracing of steps, and to so place the various parts that the indicating signs can be read from any part of the ticket lobby, and more



Diagrammatic Transverse Section



General Exterior View, Union Station, Toronto

Restaurant Kitchen

Cab Stand, Lower Level

particularly the information booth. The sequence for outgoing passengers is: ticket office, information booth, parcel claim counter, baggage checking counter, telegraph and telephone, newsstand, train waiting room for non-waiting passengers, and ticket examination booth at the foot of each platform stair. Waiting passengers find the general waiting room, dining room and toilets and other conveniences for passengers at the west end of the station.

Incoming passengers leave the train platforms by separate exit stairs and passages and pass through the low level concourse and up ramps under the colonnade to the street. In the low level concourse are provided counters for claiming of hand baggage, baggage transfer, parcel checking counter, and practically duplicates of the news, telegraph and telephone facilities provided on the floor above. Transfer passengers reach the outgoing portion of the station by stairs at each end. For close connection transfers, a controlled communication from exit passages to train waiting room is provided. The parcel and baggage checking and claim rooms are provided with communicating stairs, elevators, dumbwaiters and conveyors connecting the two levels so that they may as far as possible be operated as one facility. Baggage checking is by claim check and pneumatic tube to weighing scale in baggage room. Incoming passengers find the customs offices at the west end of the low level concourse. Outgoing cab passengers arrive at the

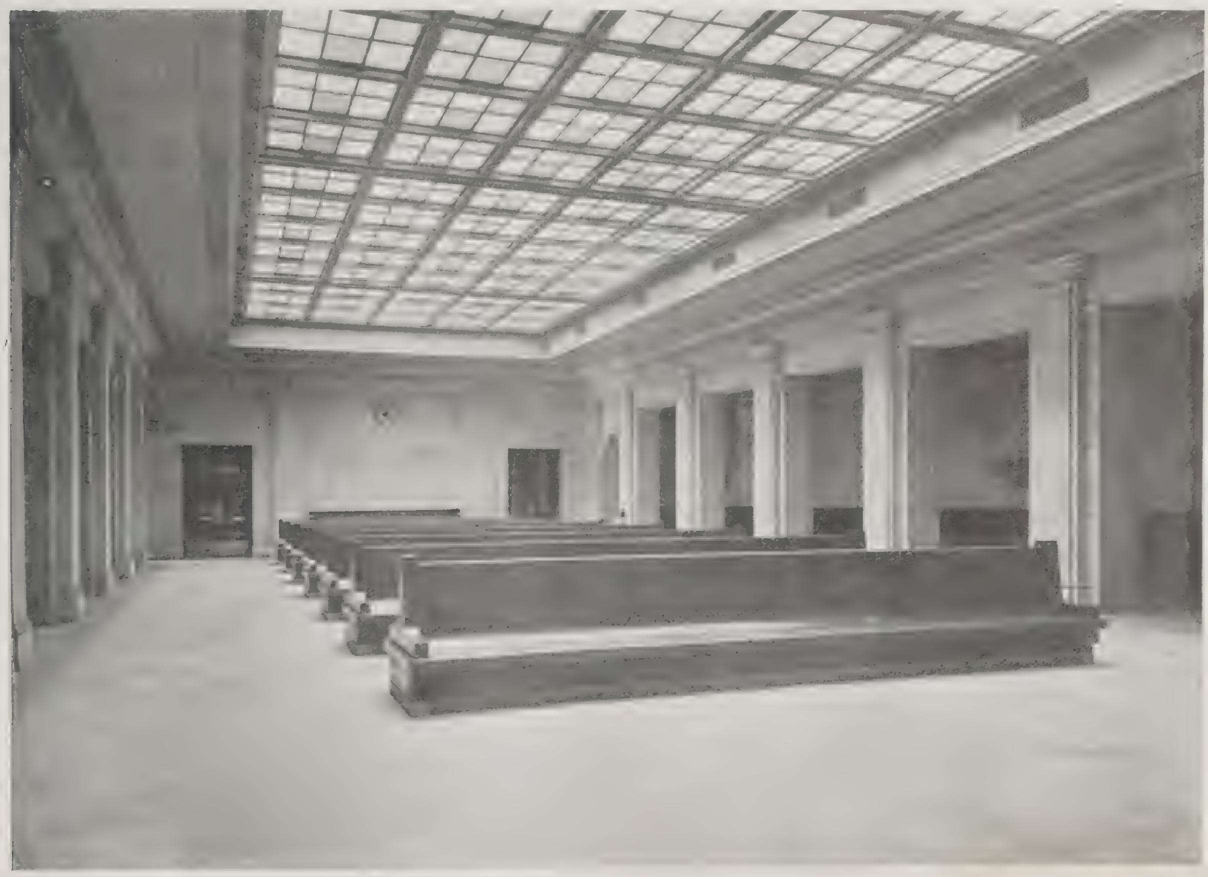
Cab Entrance, Lower Level, Looking toward Arches to Ramp

Lunch Room

Parcel Check Room

same cab stand and ascend stairs to the ticket lobby. A provision, growing out of the difficulty at the old station, is that all incoming passengers enter the low level concourse at one point where they may be readily found by waiting friends. Train arrival and departure times are shown on indicator rolls behind the information counter in the center of the ticket lobby. The exits from trains leading to each end of the ticket lobby show an alternate communication which may be used if operation of both levels is not considered necessary except during heavy traffic periods, thus providing for varying conditions.

Foundations are of concrete carried down to rock in open caissons. Structural steel columns, and beams in exterior walls, are all protected with poured concrete. Heavy traffic basement and main station floors are of reinforced concrete. All other floors, fireproofing and partitions are hollow tile. Baggage room floors are mastic; of office, composition; of toilets and similar areas, tile; corridor and public room floors are in Tennessee marble. Working area floors in post office are in maple; dining room floors, oak laid in mastic. No cinder concrete was allowed in contact with pipe work in any part of the work. Ramp floors are of tile. The exterior wall facing is mixed Indiana limestone, rubbed finish. Double-



Waiting Room, Union Station, Toronto

hung windows are of wood, the larger openings having iron frames and steel sash. Pitched roofs are of copper.

The interior wall facing of the ticket lobby, general waiting room and ramp chamber (when it is built) is of travertine, rough sawn face. Floors in public rooms are generally in varying shades of pink and gray Tennessee marble. Ticket, baggage and parcel room screens, stair balustrades and information booth are clear face pink marble. The ceiling of the ticket lobby is in three shades of tile. The ribs quite closely match the color in the stone wall facing; the panels are a complementary gray. Metal work in the large openings is painted in gray contrasting with the stone color. Metal work within 15 feet from the floor, with the exception of bronze wickets and all parts subject to wear, is of cast iron painted, glazed and wiped to imitate bronze. Dining room paneling is of fumed and waxed oak with carved ornament. The floor border is black marble and base dark pink Tennessee.

Detail in Ticket Lobby

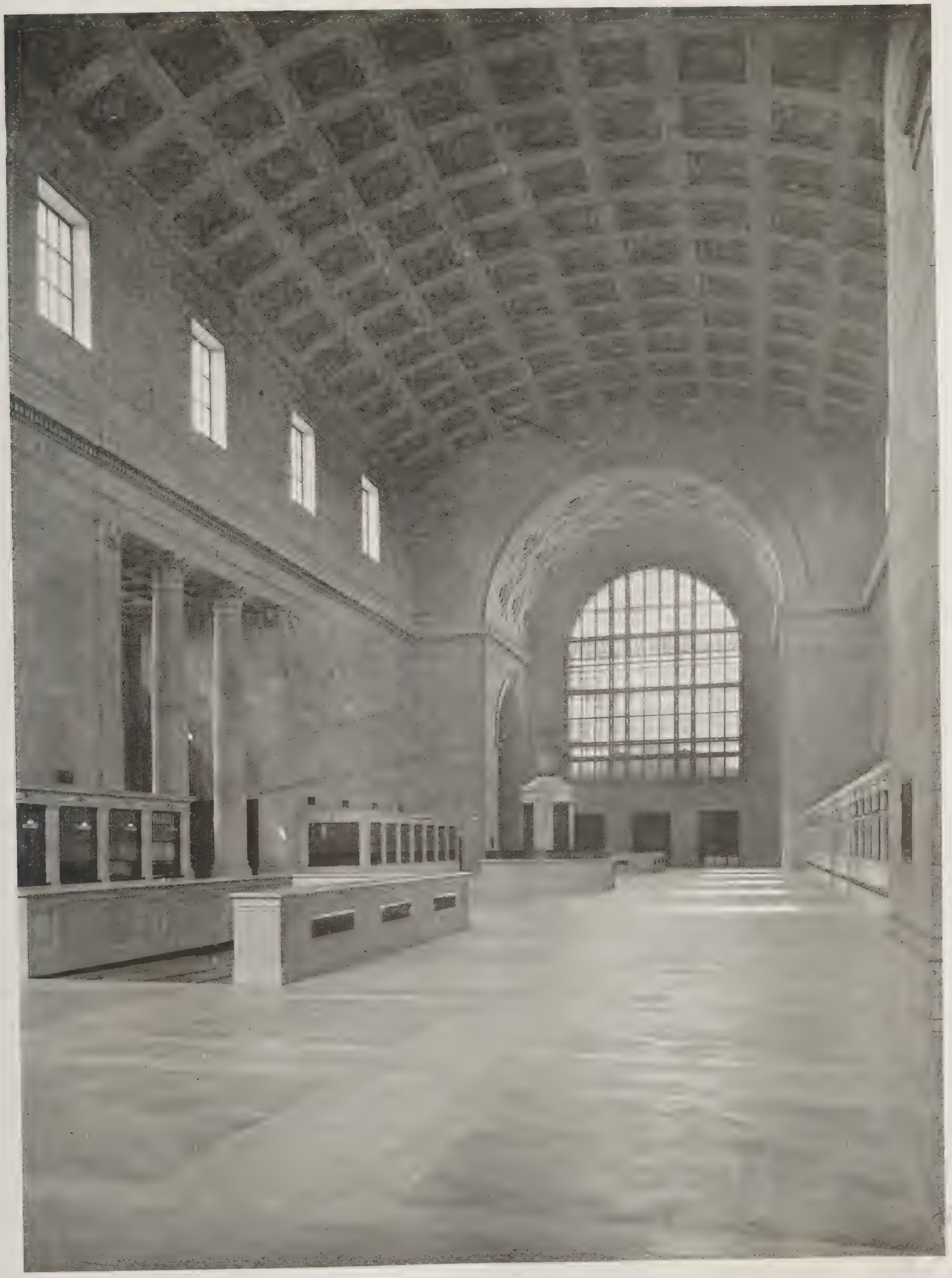
The lighting of the ticket lobby is, with the exception of five recess fixtures, by trough fixtures placed over ticket, baggage checking and parcel room screens. The exterior standards between columns at exit ramps are for flood lighting the wall back of the colonnade. The general waiting room and dining room are lighted through the glass ceiling. Supplementary fixtures and floor plugs are provided for auxiliary local lighting.

The heating and ventilating of the ticket lobby, exit concourse, immigrants' waiting room, general waiting room, dining room and toilets throughout the building, are entirely by blower and exhaust fan systems. All other portions of the building are direct steam heated, with in some cases air supply and exhaust, and in other cases exhaust only.

Including the post office, the building contains about 10,000,000 cubic feet. This does not include any allowances for retaining walls and approaches. The total cost, including architects' and contractors' fees, amounted to about $6,000,000. There is no power house included in the scheme, as both steam and current are purchased from outside sources, thus adding to the area which is available for the ordinary station purposes.

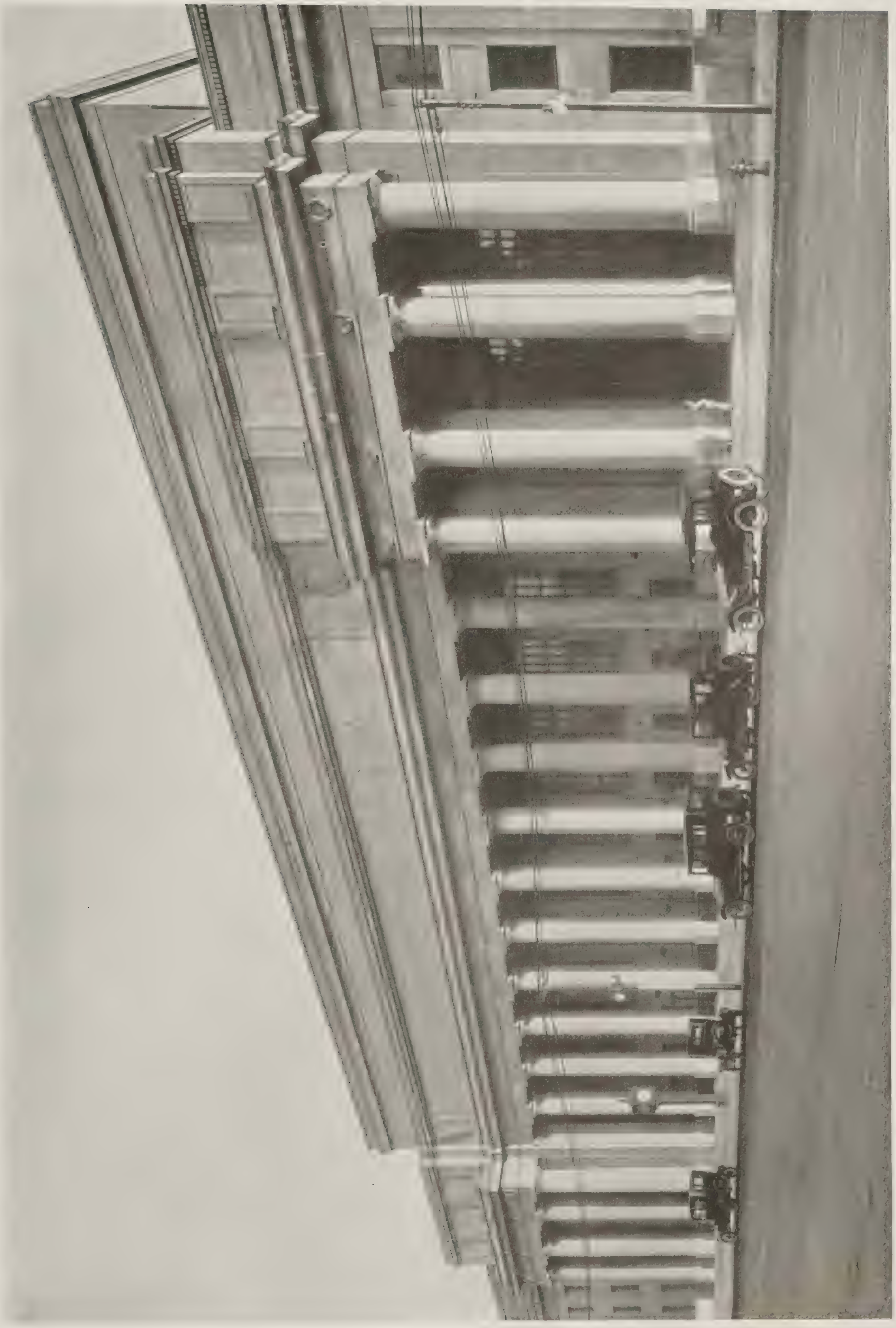
Detail of Ramp Rail

Ramp behind Colonnade

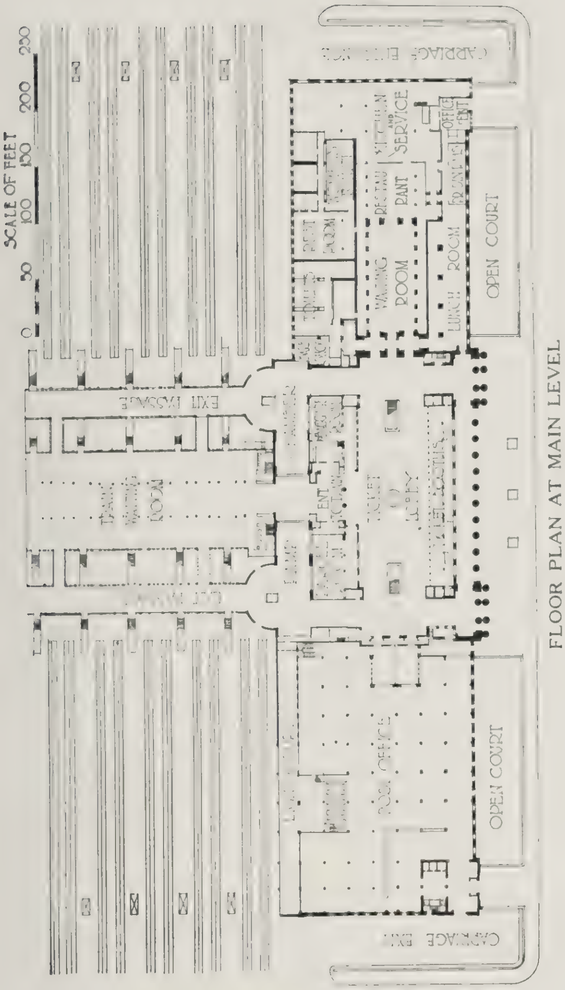


TICKET LOBBY LOOKING TOWARD WAITING ROOM
UNION STATION, TORONTO
ROSS & MACDONALD AND HUGH G. JONES, ARCHITECTS; JOHN M. LYLE, ASSOCIATE

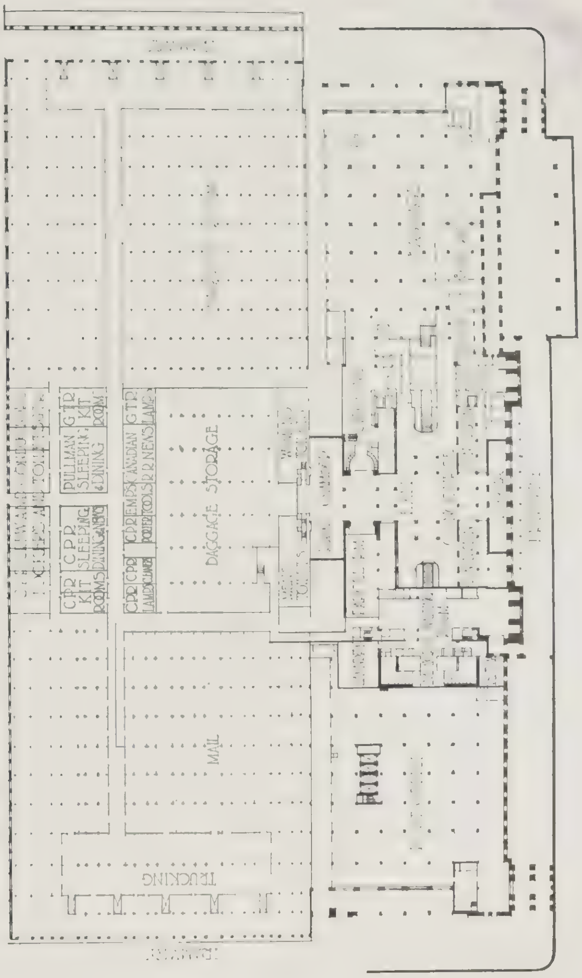
*Photos, Paul J. Weber*



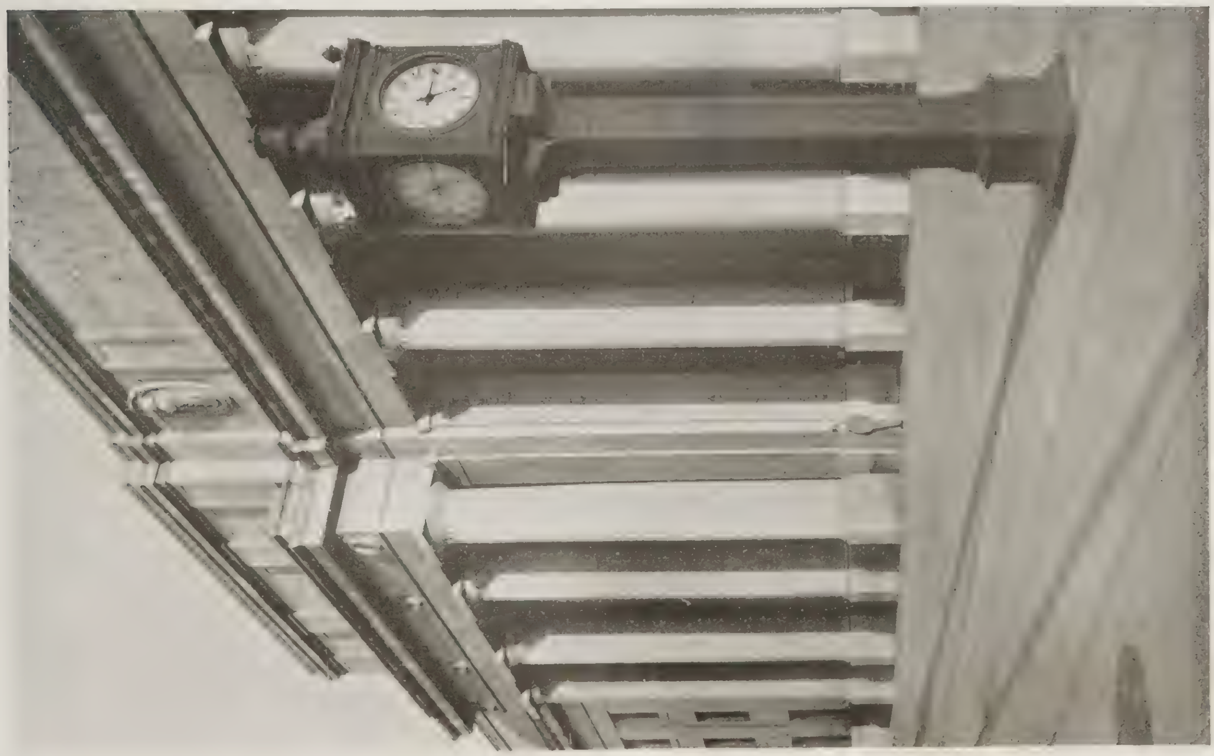
ENTRANCE COLONNADE
UNION STATION, TORONTO
ROSS & MACDONALD AND HUGH G. JONES, ARCHITECTS; JOHN M. LYLE, ASSOCIATE



FLOOR PLAN AT MAIN LEVEL



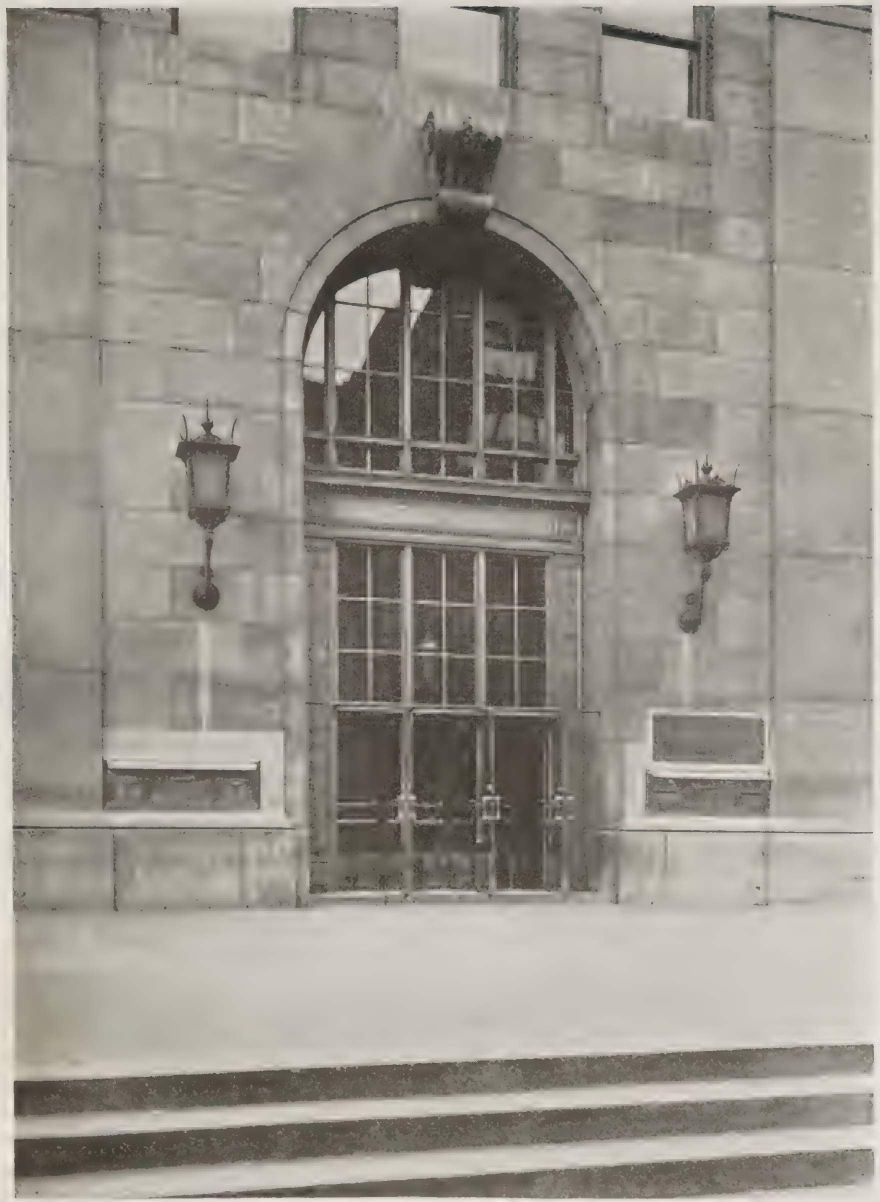
FLOOR PLAN AT LOWER LEVEL



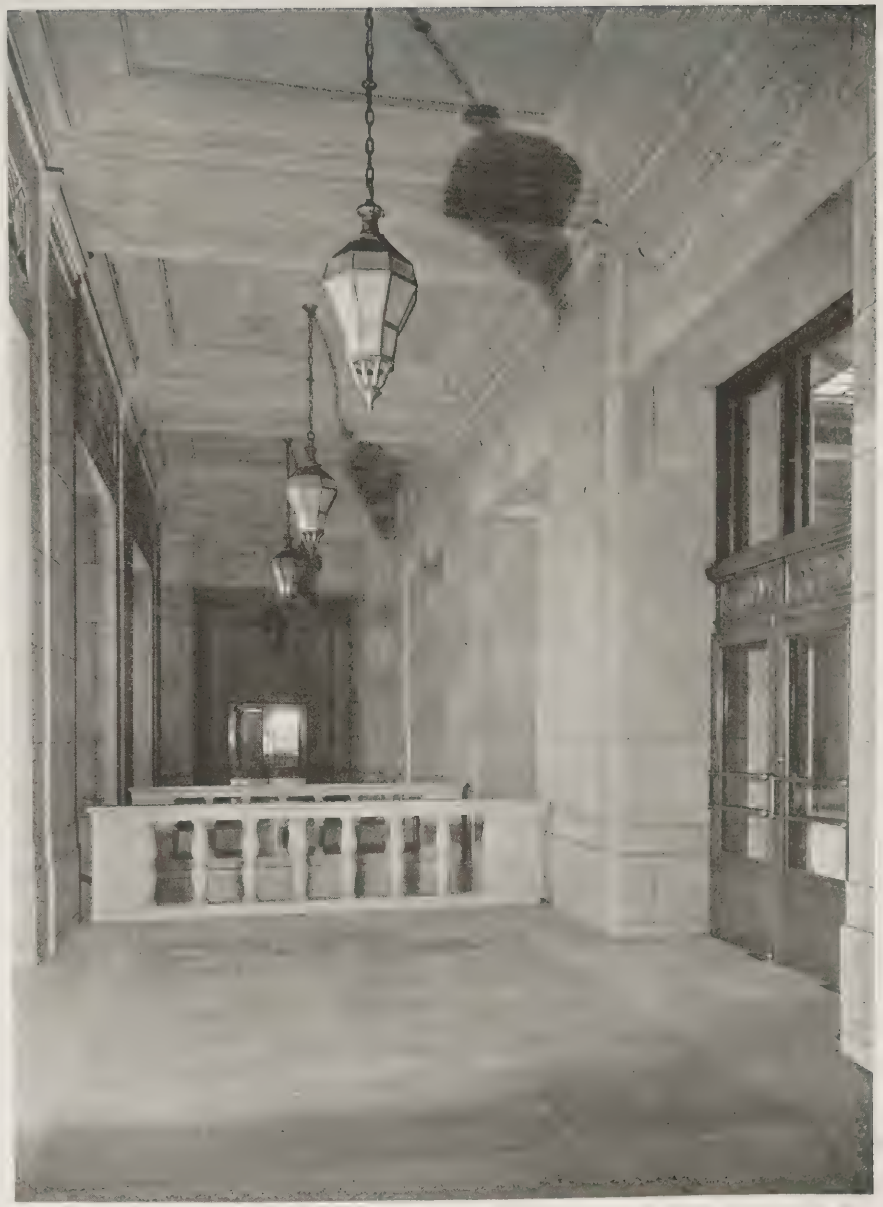
DETAIL OF ENTRANCE COLONNADE

UNION STATION, TORONTO

ROSS & MACDONALD AND HUGH G. JONES, ARCHITECTS; JOHN M. LYLE, ASSOCIATE



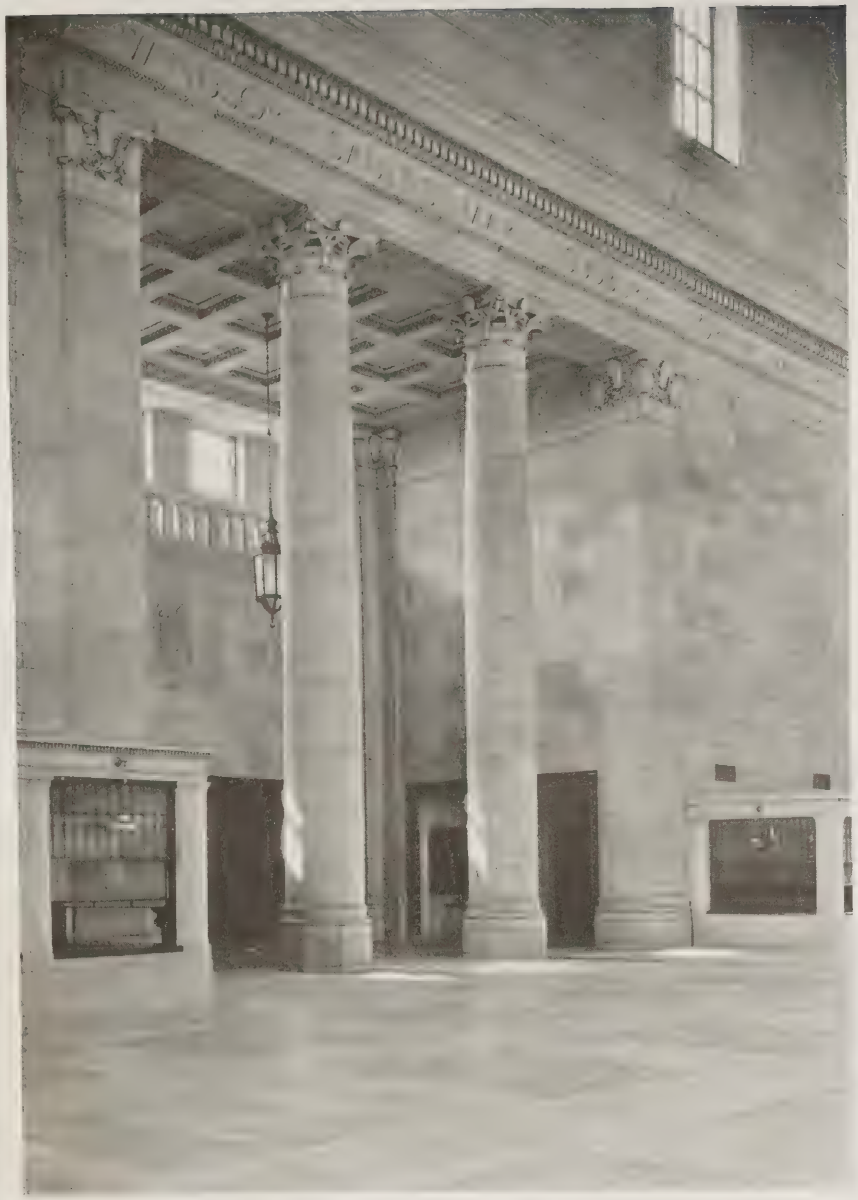
DETAIL OF POST OFFICE ENTRANCE



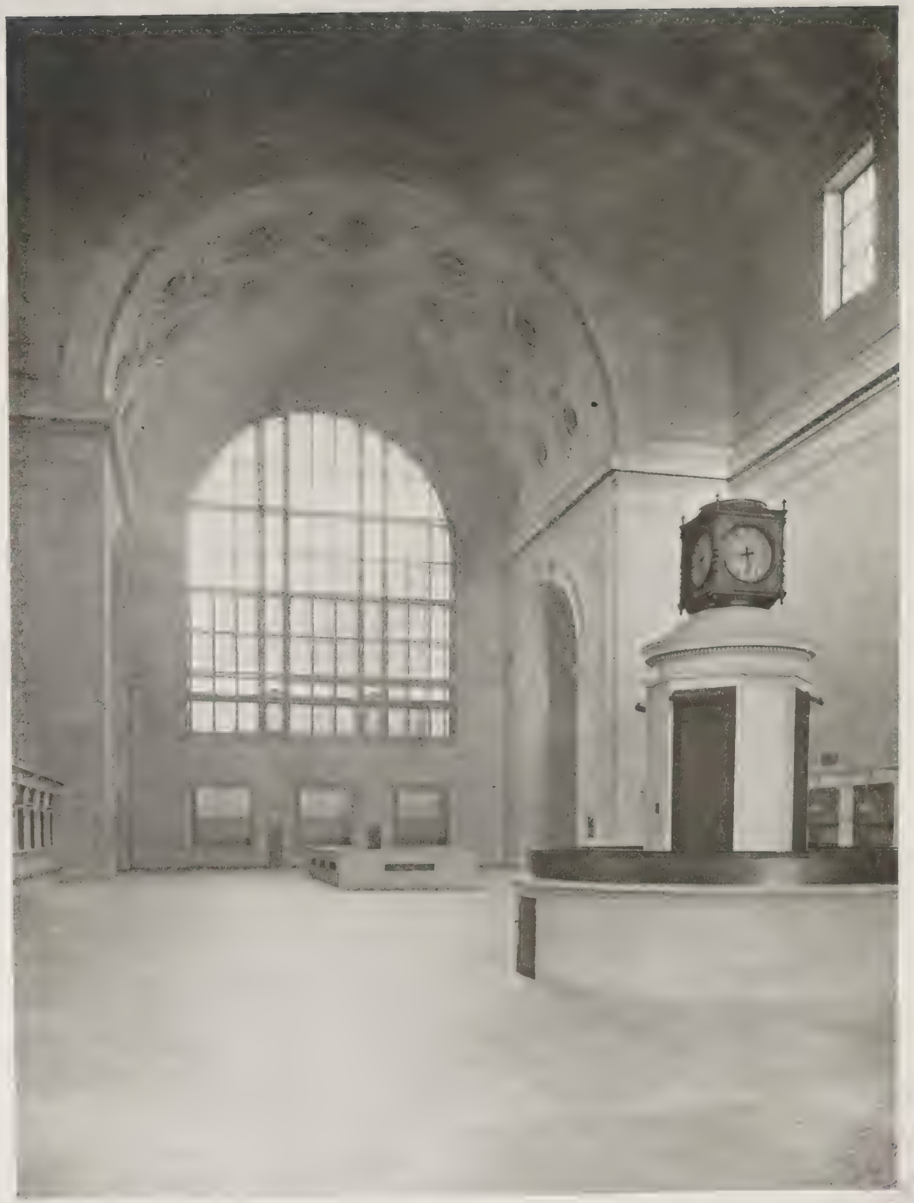
CORRIDOR BETWEEN TICKET LOBBY AND WAITING ROOM

UNION STATION, TORONTO

ROSS & MACDONALD AND HUGH G. JONES, ARCHITECTS; JOHN M. LYLE, ASSOCIATE



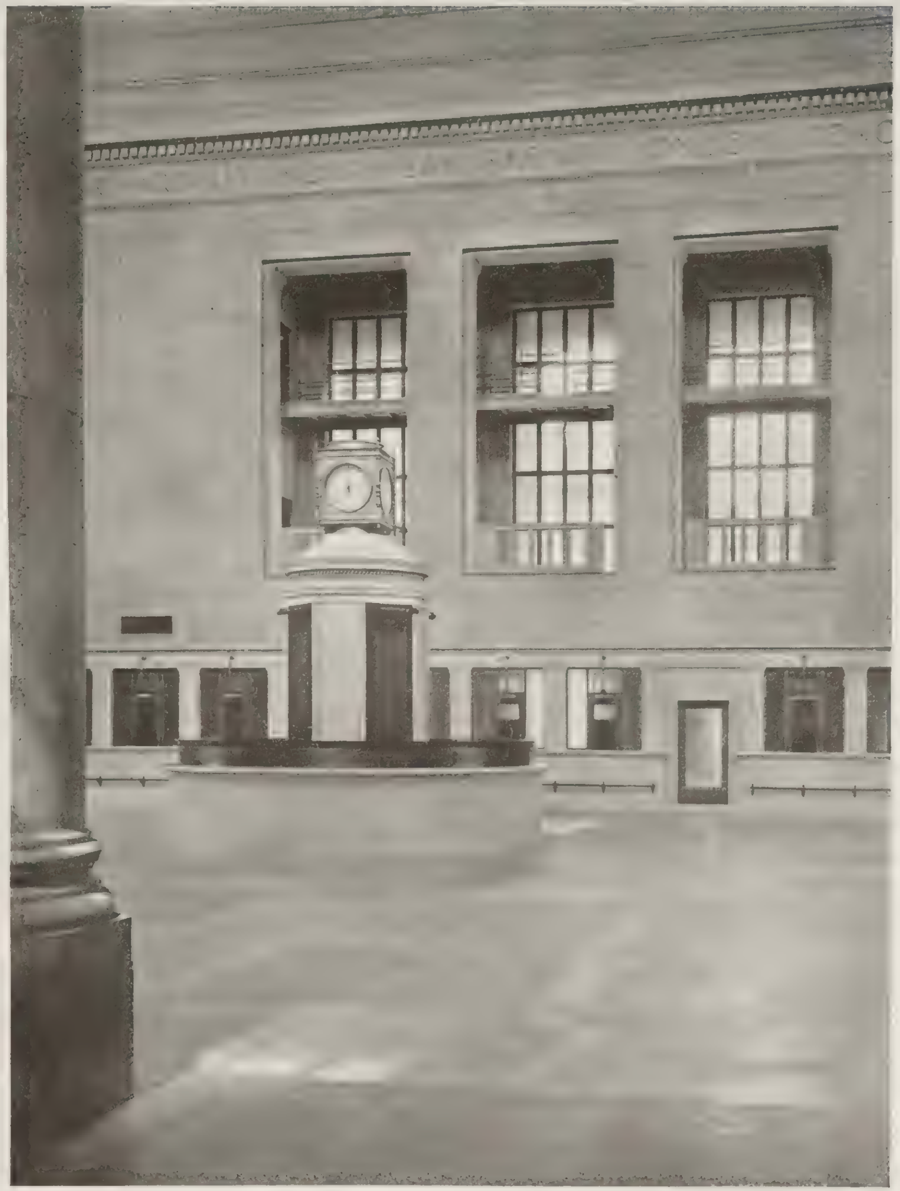
TRAIN CONCOURSE ENTRANCE



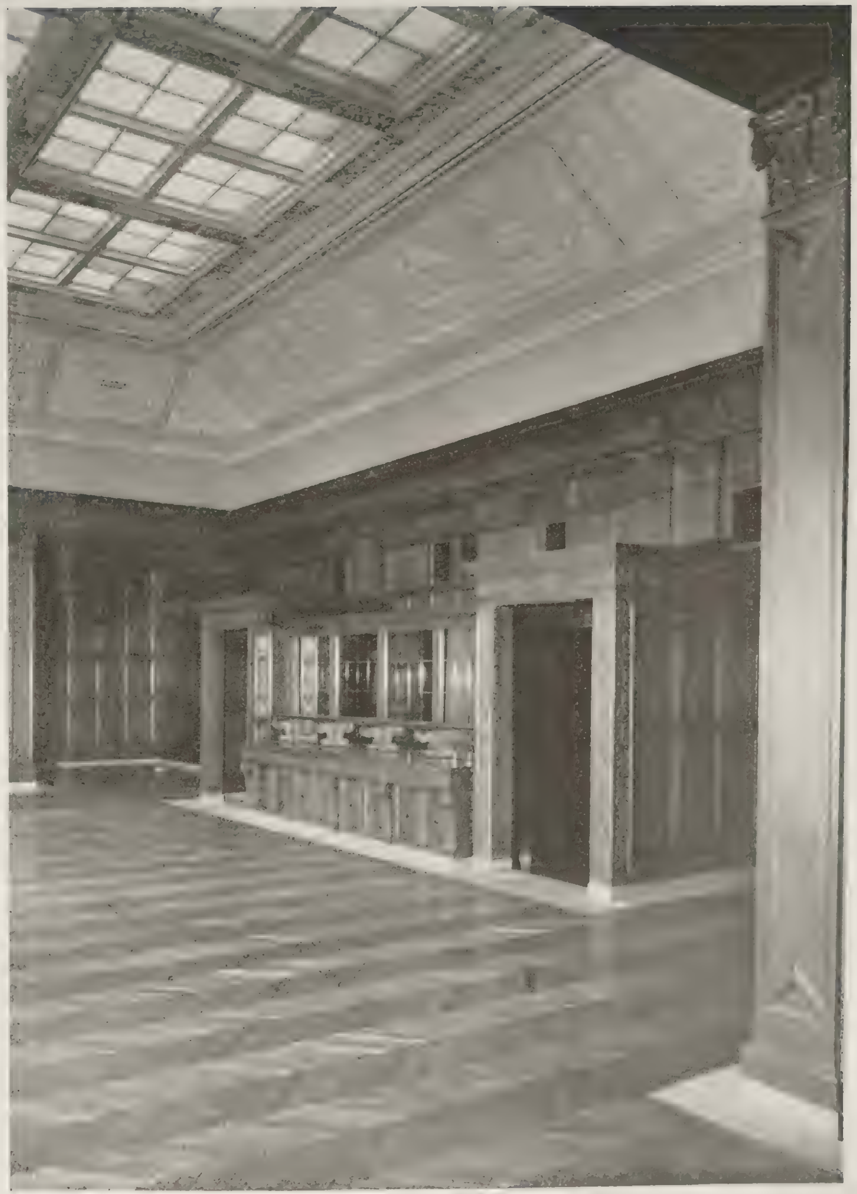
TICKET LOBBY SHOWING INFORMATION COUNTER

UNION STATION, TORONTO

ROSS & MACDONALD AND HUGH G. JONES, ARCHITECTS; JOHN M. LYLE, ASSOCIATE



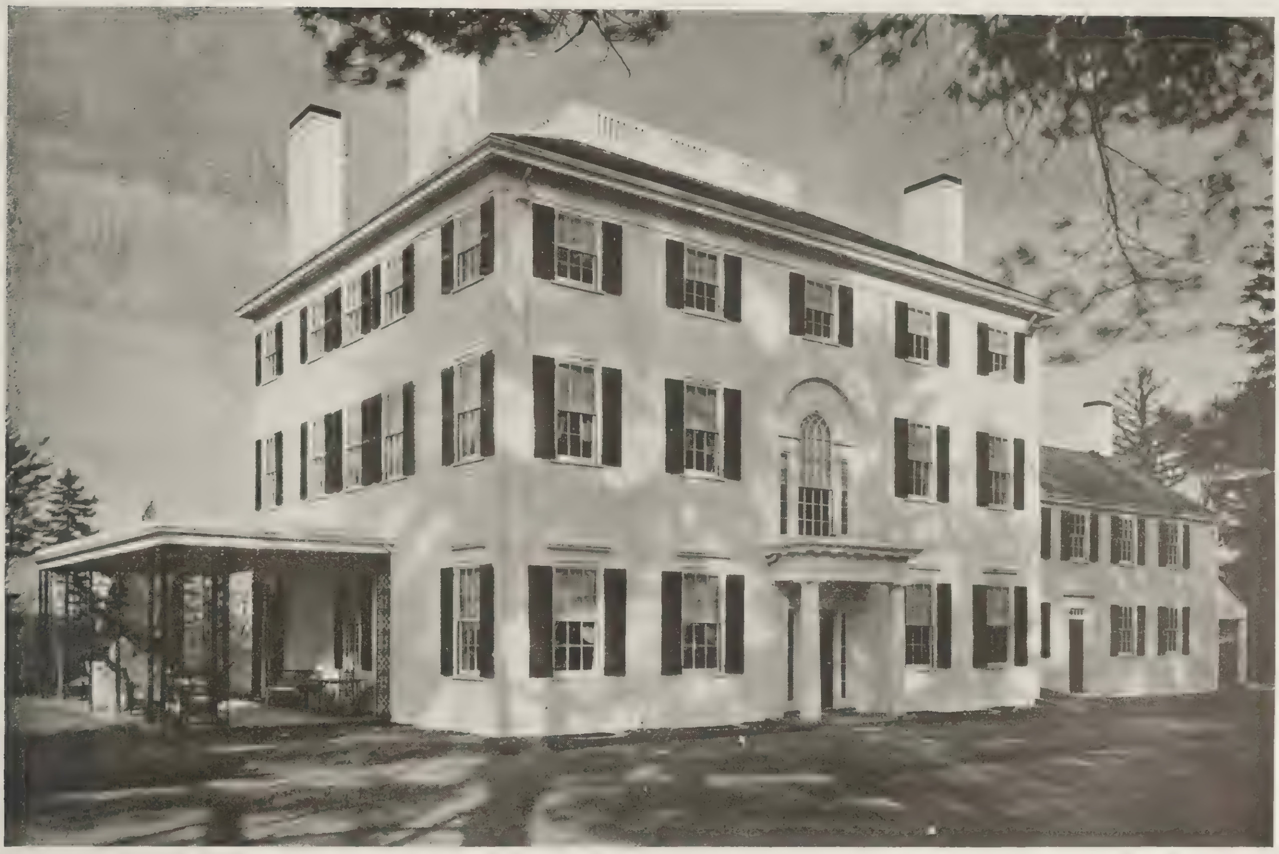
VIEW ACROSS TICKET LOBBY FROM CONCOURSE



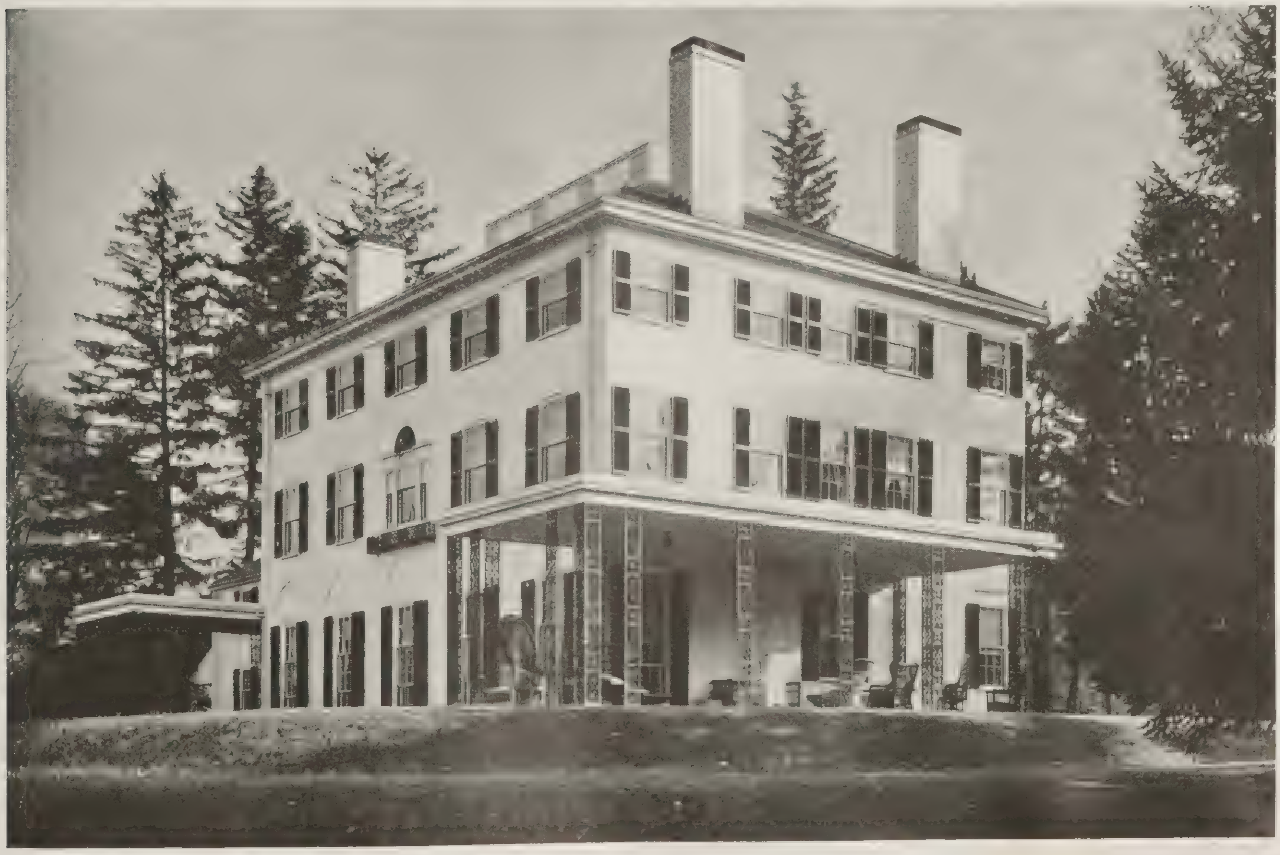
SERVICE END OF RESTAURANT

UNION STATION, TORONTO

ROSS & MACDONALD AND HUGH G. JONES, ARCHITECTS; JOHN M. LYLE, ASSOCIATE



GENERAL VIEW OF ENTRANCE FRONT

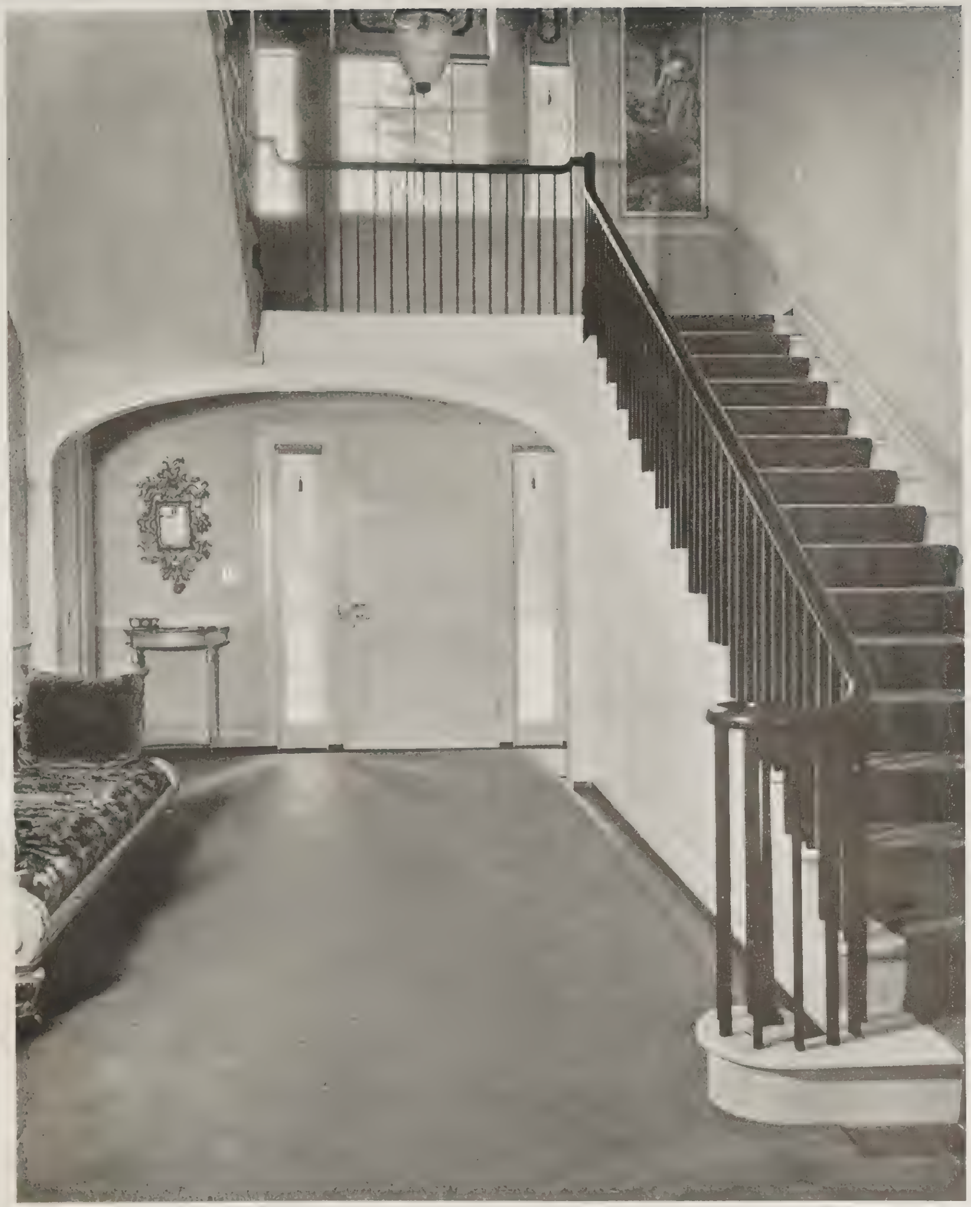


GENERAL VIEW FROM GARDEN

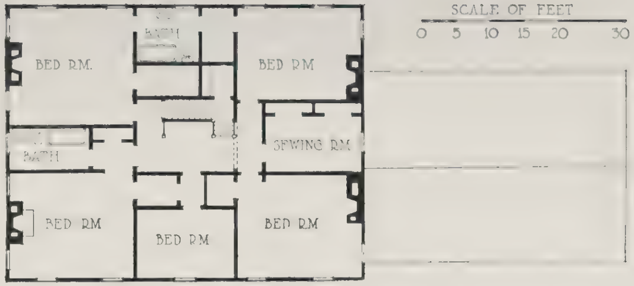
HOUSE OF MRS. R. M. BISSELL, FARMINGTON, CONN.

EDWIN S. DODGE, ARCHITECT

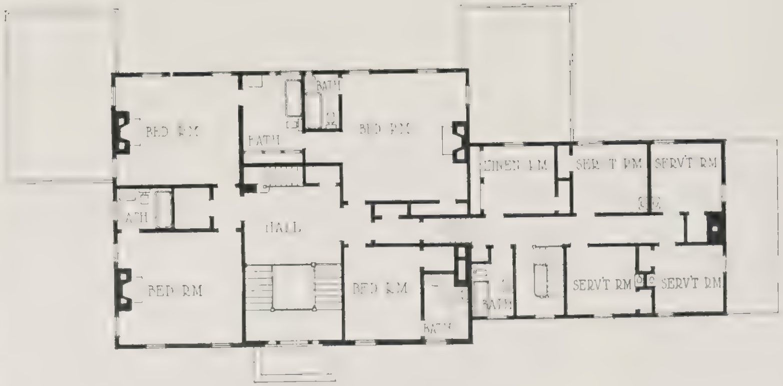
*Photos. Paul J. Weber*



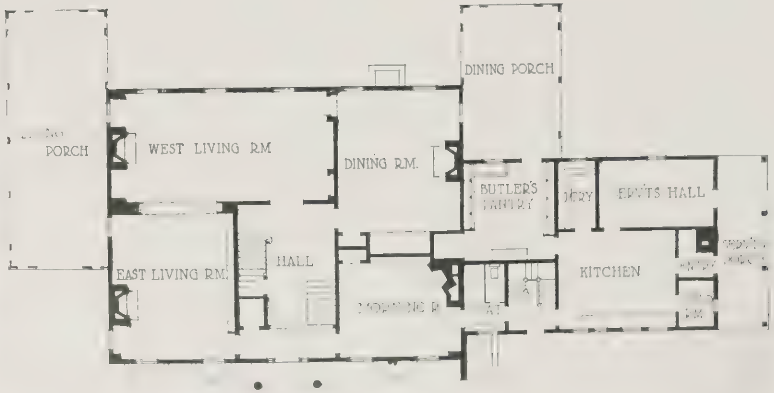
STAIR HALL



THIRD FLOOR PLAN

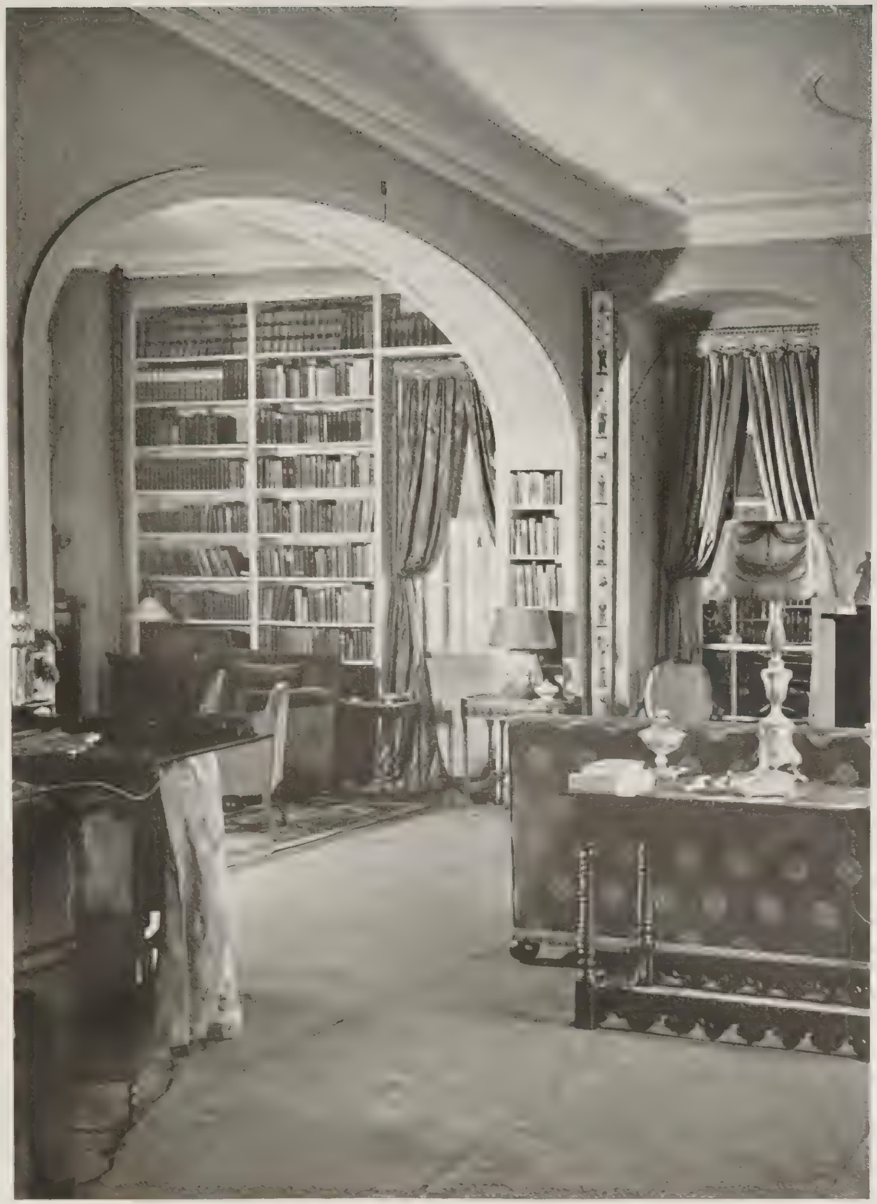


SECOND FLOOR PLAN

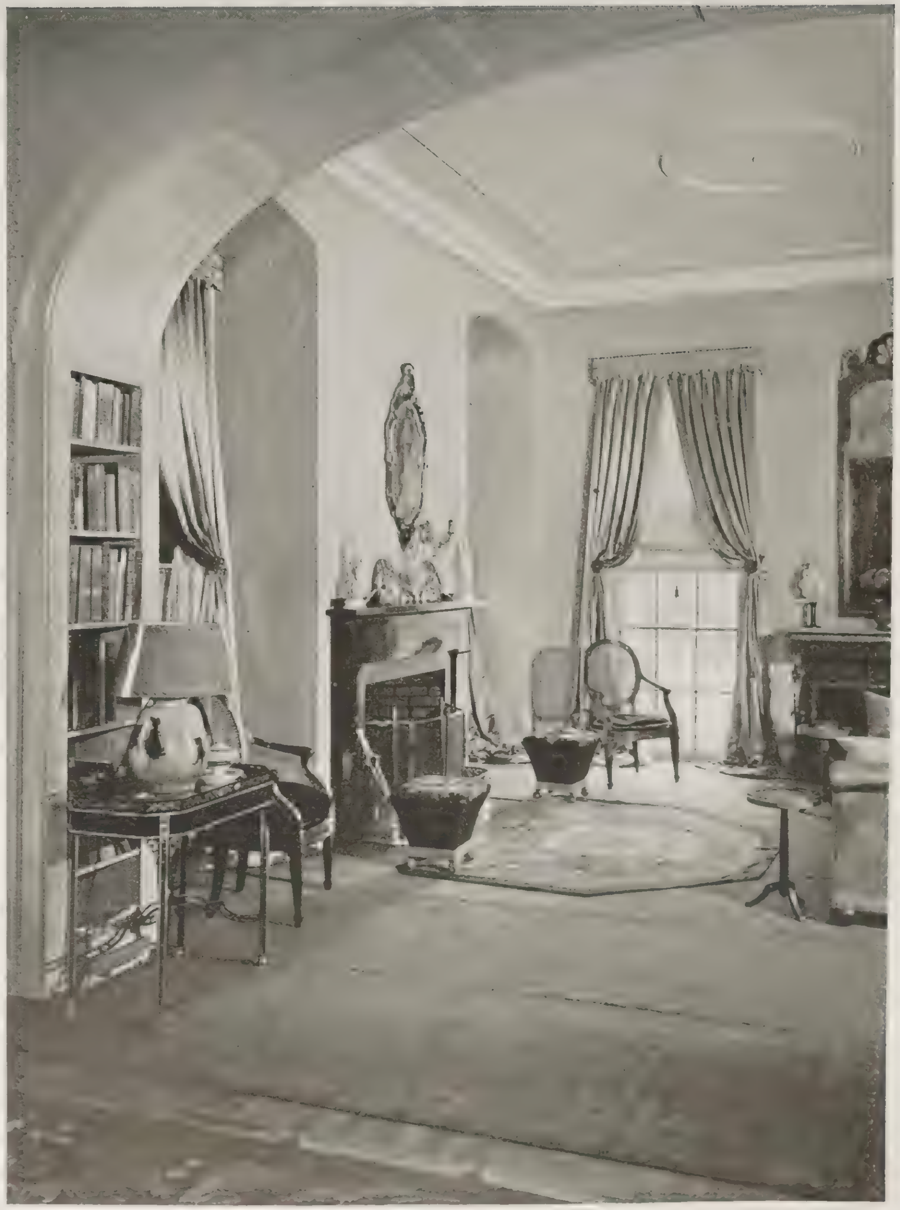


FIRST FLOOR PLAN

HOUSE OF MRS. R. M. BISSELL, FARMINGTON, CONN.
EDWIN S. DODGE, ARCHITECT



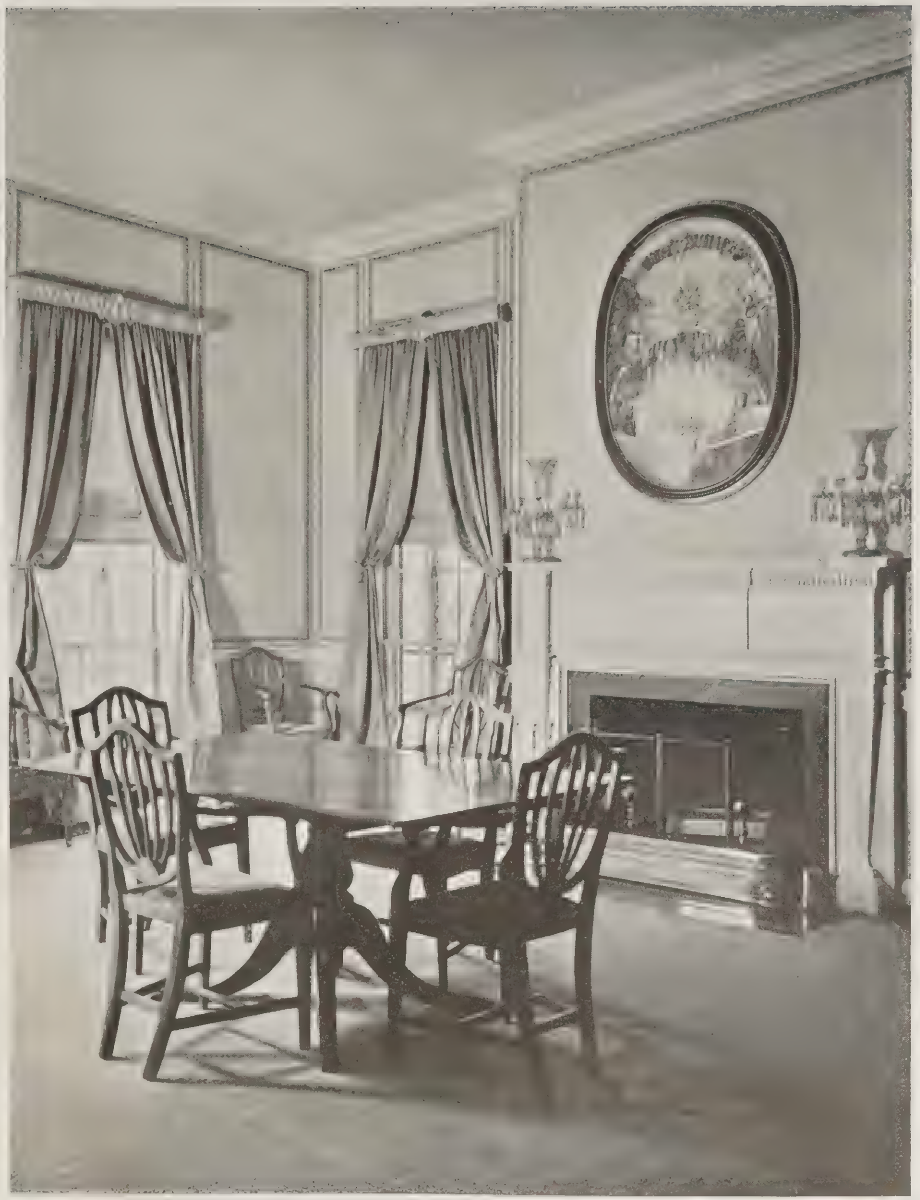
ARCHWAY TO EAST LIVING ROOM



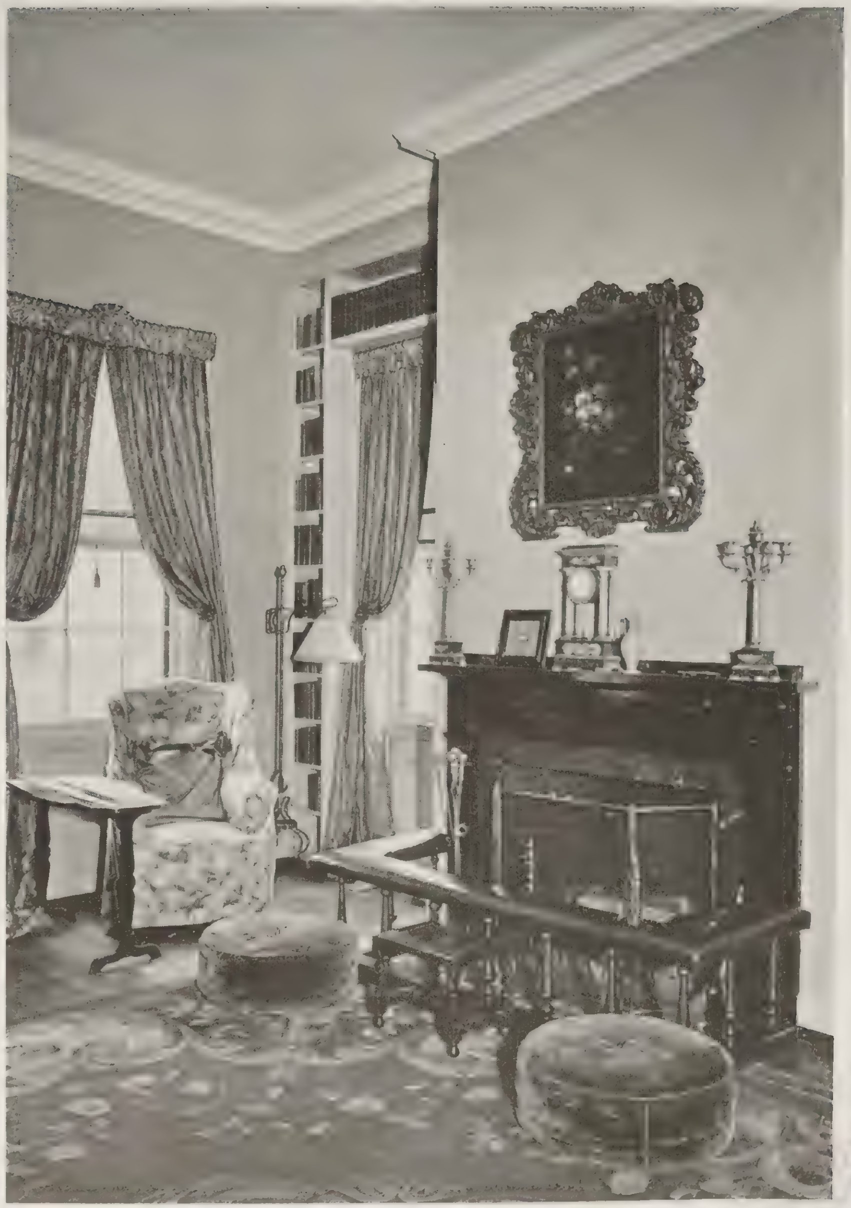
END OF WEST LIVING ROOM

HOUSE OF MRS. R. M. BISSELL, FARMINGTON, CONN.

EDWIN S. DODGE, ARCHITECT



DINING ROOM MANTEL



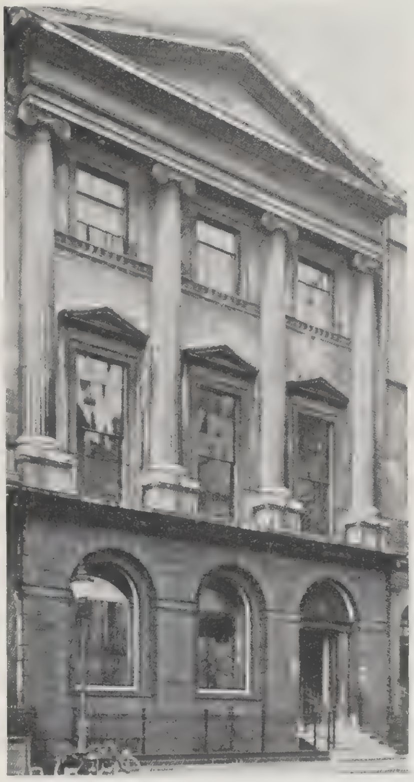
EAST LIVING ROOM MANTEL

HOUSE OF MRS. R. M. BISSELL, FARMINGTON, CONN.
EDWIN S. DODGE, ARCHITECT

# The Greek Revival

## II. ITS MANIFESTATION IN ENGLAND

*By* HOWARD MAJOR



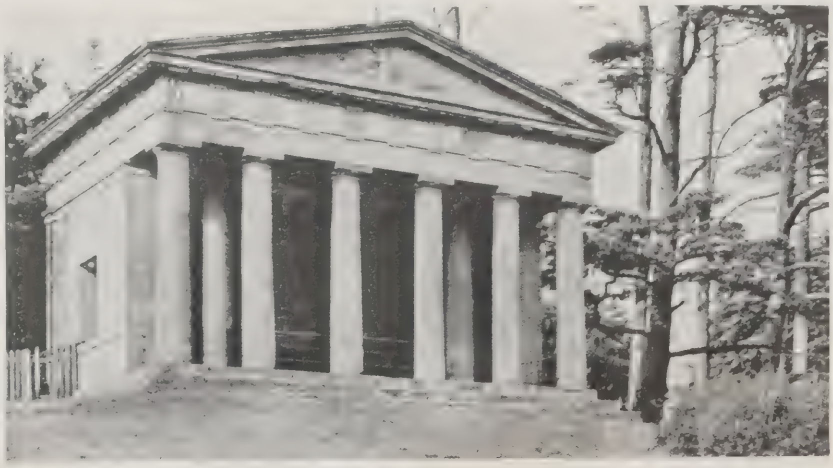
No. 15 St. James Square, London
By James Stuart, 1760. The first example of the Græco-Roman school

UNLIKE Americans, the English were not completely swept off their feet by the Greek revival, nor did it have their undivided attention. In England the Gothic revival was contemporary with the Greek phase throughout its entire duration. The British mind and the British architect were amenable to these two styles, and therefore the extent of the Greek revival was limited in comparison to its scope and realization in America. The English expression inclined toward too much originality and the too frequent adoption of motifs unharmonious with Greek forms.

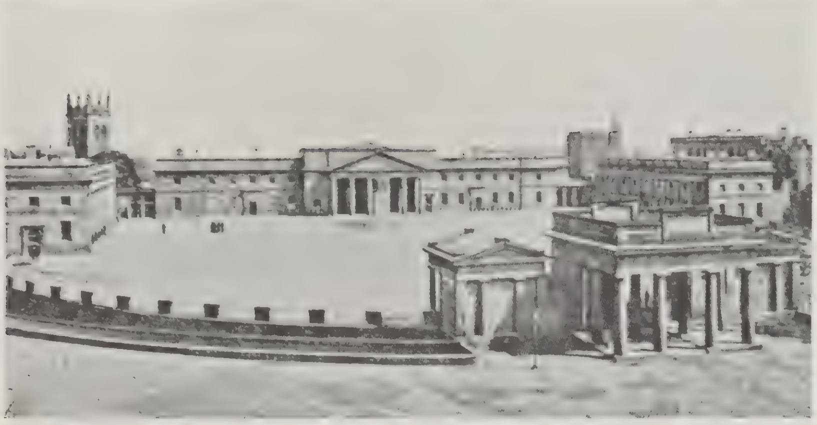
Nevertheless, these faults were to produce the masterpiece of the day: the Greek pedimented church with the high spire centrally located. The result was a composition of dignity, grace and refinement, which may be compared with the architecture of all times. Furthermore, in England the Greek phase in its entirety was adapted to public buildings, whereas the Gothic was more commonly used for clothing the smaller domestic work. In America we can follow its development by means of the home, but in England we have to resort to the public edifice. It is a deplorable fact that we have practically no photographic record of small English houses of the Greek phase. In fact, it is to be regretted that we have very scant data of the small house throughout Europe. In this respect Europe may learn a lesson from us and imitate our exhaustive research on Colonial architecture, and we may in turn direct attention to our Greek revival and procure photographic data to hand down to posterity.

In the spirit of the classic tradition, as in all great periods of the past, lies the greatest promise for art in the future. The Greek phase approaches the essence of classic tradition more nearly than any period heretofore. For a century it has lain dormant, but today there is a growing appreciation of it and an interest which replaces the indifference and derogatory criticism of yesterday.

The forces that led up to this movement began long ago, far back in the days of Inigo Jones. The movement first bore definite fruit in the early eighteenth century and consistently developed with the aid of constantly increasing data on classical architecture. Under the patronage of Lord Burlington there developed a definite trend toward correct interpretation of Palladio's works which was further strengthened by direct study of Roman ruins. In 1715 appeared the first English translation of Palladio by Giacomo Leoni. Nothing will more adequately illustrate the trend of the time than a review of the many translations of Palladio. In 1721 a second edition of Leoni's work was published. In 1729 Colin Campbell's translation appeared, to be followed in 1735 by the version of Edward Hoppus with still another edition in 1736. Then Isaac Ware's well known translation appeared in 1738, to be followed by two further editions. Thus was born the Roman Palladian phase, which was to continue throughout the entire eighteenth century. In 1753-1757 Wood and Dawkins published two volumes upon Baalbec and Palmyra, thereby directing attention to the magnificence of Roman architecture. The next step, and

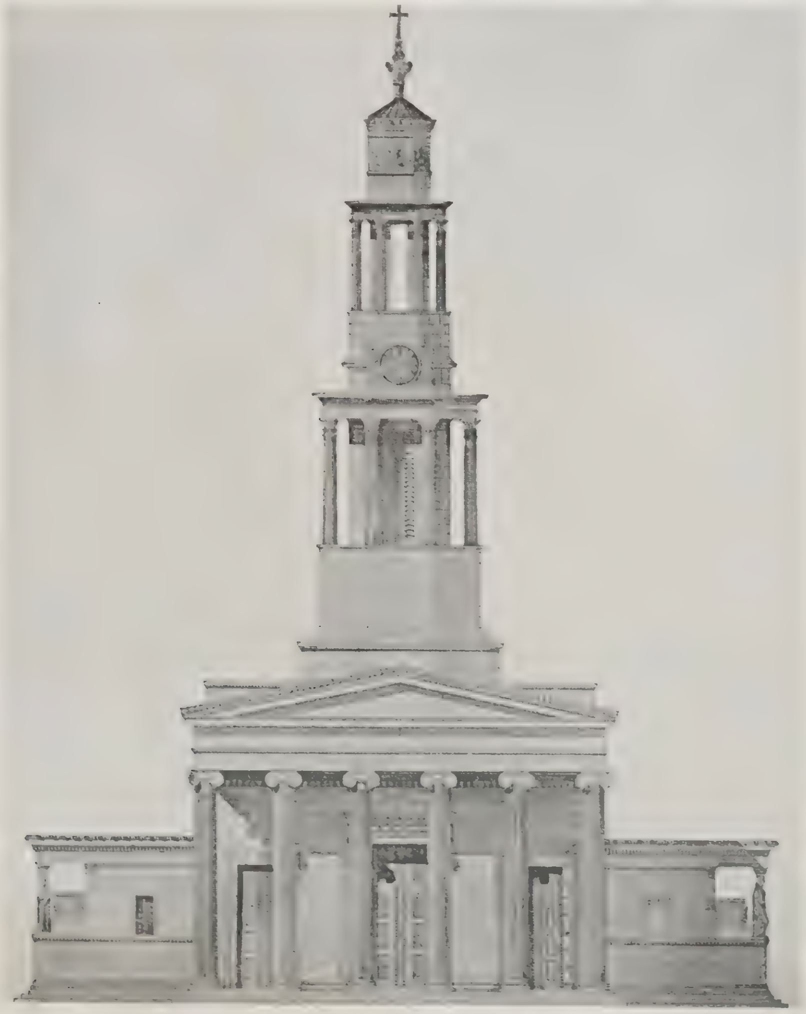


**Garden Temple at Hagley for Lord Lyttelton**
By James Stuart, 1758. The first example of the Greek revival in Europe



The Castle, Chester, 1793-1820
By Thomas Harrison. The entrance portico, with its two flanking temples 35 years later than Hagley, is another of those curious isolated examples,—forerunners of what was to follow

from this dates the birth of the Greek phase, was the appearance of Stuart & Revett's first volume of their famous "Classical Antiquities of Athens," published in 1762. Many volumes on Greek and Roman architecture now appeared and continued to appear throughout this as well as the following century.

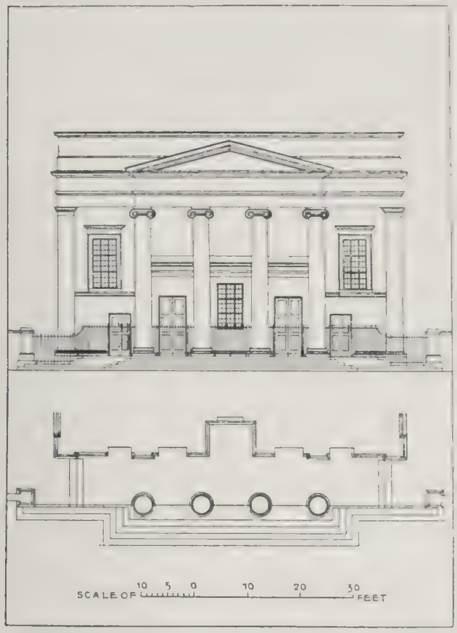


St. Pancras' Church, London, 1819-1822
The Inwood brothers, Architects. The "chef-d'œuvre" of the phase. The delightful composition of the churches of this period is a tribute to English taste

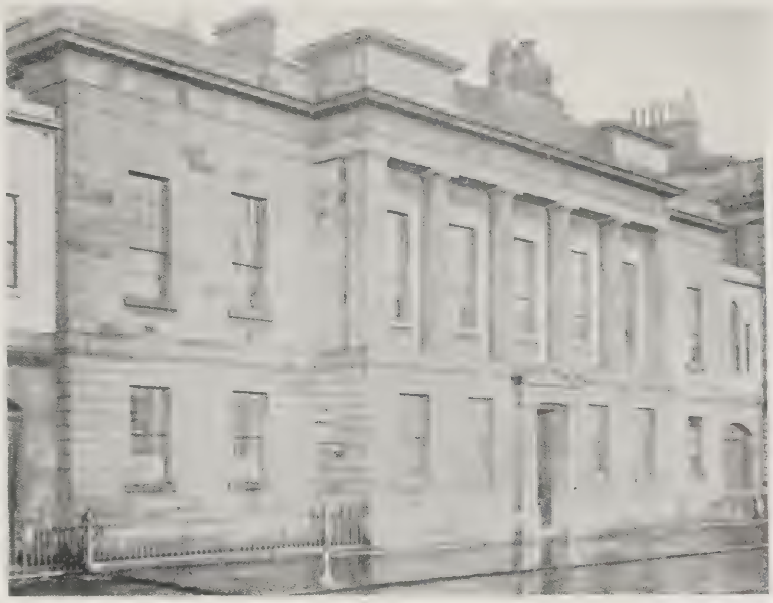
The distinction of being the first architect of the Greek revival in all countries belongs to James Stuart, the pioneer in Greek research. As early as 1758 he designed and built the Greek Doric garden temple at Hagley for Lord Lyttelton. In this stone structure he produced a hexastyle temple with a massive dignity and refinement such as might have been created by the ancients. This building was the prototype of the prevailing style of 60 years later, and was the first Greek architecture to appear in western Europe. Although this is a building for domestic use, it must not be confused with a dwelling, as it was not used for such a purpose. The garden temple had for many years been a favorite form of decorative expression. Stuart, in this garden temple, completely broke away from the Græco-Roman school, to which he gave origin two years later in his design for No. 15 St. James Square (1760). This school was to gather its momentum in 1780 and endure until 1820. Here Stuart exhibited his versatility by adapting Greek forms to the vernacular style of the Palladian school. He was also the architect of the chapel at Greenwich Hospital, in which he placed an interior portico of a Greek Ionic order with an ingenious intermingling of Renaissance detail.

Of all the great English architects of the eighteenth century there was not one whose influence was destined to be felt in the succeeding century as was Stuart's. However, he had few opportunities, for being in advance of the popular trend, his commissions were naturally limited in number. At this time the brothers Adam justly controlled the field of British architecture, far eclipsing Stuart and his contemporaries. Yet his pioneer labors instantly acted as a check to the prevalent style and somewhat aided the Adams' manner of classical restraint.

Henry Holland (1744-1806), who next appears on the scene, at the time created attention as the originator of the Græco-Roman style, although the title properly belonged to Stuart. In 1786 he executed for the Duke of York a



**Belgrave Chapel, London, S. W., 1825**
Sir John Smirke, Architect

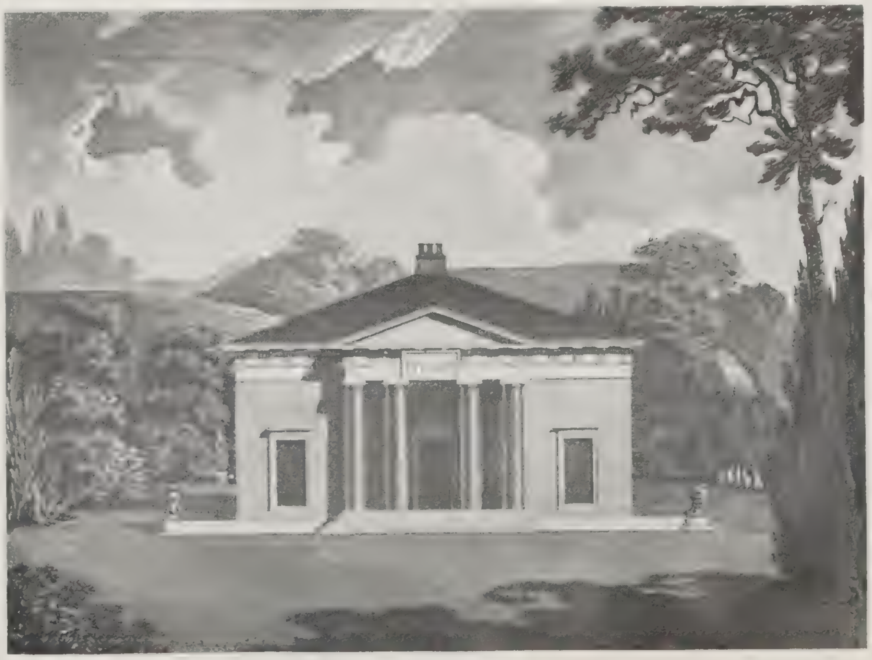


**The Custom House, Glasgow**
By George Ledwall Taylor. Very late Græco-Roman phase; splendid, restrained design, worthy of study

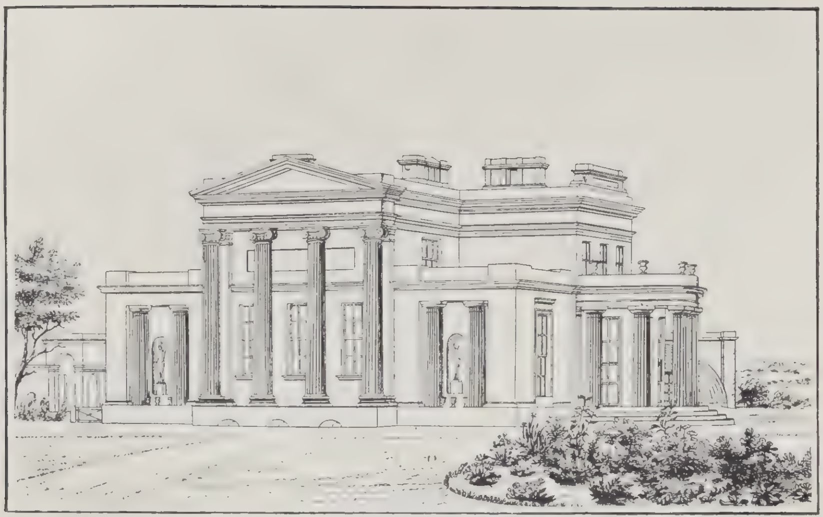
charming Greek Ionic portico. In 1799 Holland was successful in competition with Soane and Dance for the East India Company's building. The facade included a pedimented portico of the Greek Ionic order. Holland possessed a large practice, but the most of his work was in the style of the Palladian school. His later work was derived from this school, leavened with Græco-Roman detail. Thus was the seed of Greek architecture sown; many buildings with Greek detail of this Græco-Roman phase now flourished everywhere. One of the architects of this school, particularly interesting to us, is S. P. Cockerell (1754-1827) because of his pupil, Benjamin Latrobe, with whose work we are all familiar.

In 1793, 35 years after the building of Stuart's garden temple at Hagley, we again find an isolated example of a Doric temple in two small buildings flanking the Greek portico entrance to Castle Chester. Thomas Harrison, the architect, secured this commission in competition, and although the entire work was not completed until 1820, we may assume, without evidence to the contrary, that his prize winning design of 1793 was carried out. This building and Stuart's temple at Hagley are isolated examples, and it is not until 1820 that we find the pure Greek revival under full swing.

Of this period of 1800 the reputation of no contemporary has survived as has that of Sir John Soane, who left to posterity his home together with his superb collection of furnishings, library and art objects. This museum is unique in that it gives one an intimate insight into the art and life of the period. It is one of those personal, small affairs which create an endearing impression which the large galleries fail to give. Soane was born in 1753 and died in 1837. After winning honors as a student of architecture in England, he traveled in Italy, returning in 1780 to begin an undisputed practice. In 1788 he was appointed architect for the Bank of England, and fresh honors were frequently awarded to him.



**Elevation of a Villa**
From "Sketches in Architecture," by Sir John Soane, 1798. An early example of a dwelling in the Greek style



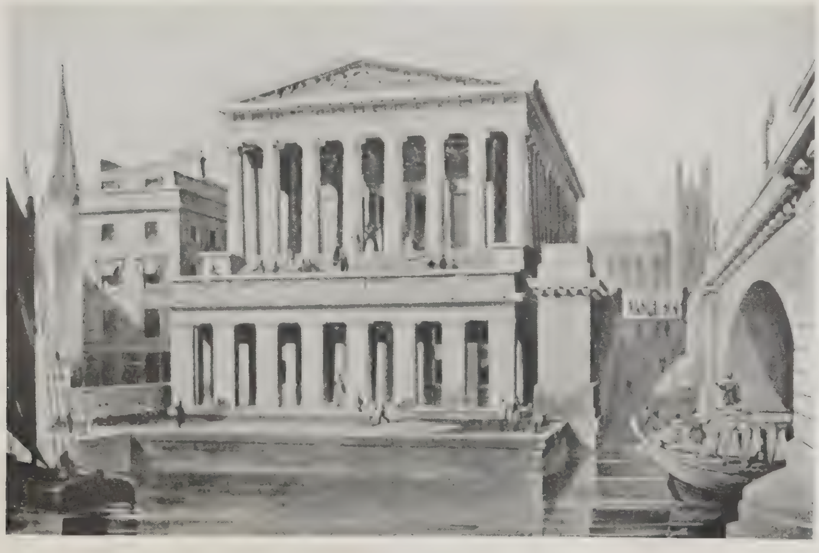
Villa in Regent's Park, London, 1822
Decimus Burton, Architect. From "Public Buildings of London," by Pugin and Britton, London, 1838

His greatest work is the Bank of England, with which we are familiar. Soane accomplished nothing toward furthering the cause of the Greek revival, but it would not be fitting to write of this period without mention of this famous architect. His egotism, resulting from the many honors bestowed, caused him to believe that he could create an original architecture. This presumption was his great fault and the cause of a large amount of unfavorable criticism. However, strange to relate, Soane appreciated the inestimable value to an architect of a good library, a lesson most of the architects of today may take to heart. Soane's deterioration from the higher standards of his earlier work may be readily traced through an examination of his successive monographs, which from time to time were generously offered to the public. At least we must admit that Soane for his day clearly understood the value of advertising through these publications. In fact he could serve as an exponent of the advanced methods of today in that he further advertised his name to posterity by the gift of his home as a museum.

Of the architecture of this Græco-Roman period none, excepting the garden temple of Hagley and the entrance to Castle Chester, indicated an understanding of the spirit of Greek architecture. It consisted of a thorough understanding of Greek detail only, to be applied to the Palladian style of the day. A good illustration of this is the Custom House at Glasgow by George Taylor. The Doric order is an admirable example of Greek detail, but wherein can one find the Greek spirit with the order used over a prominent basement story? It is, however, a splendid, restrained design and an unusually fine blending of Palladian and Greek architecture.

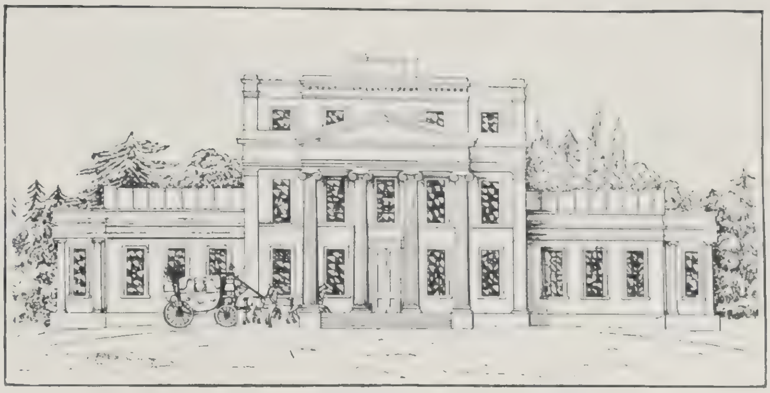
### The Greek Revival, 1820-1850

There is no doubt but that this architecture of the early years of the nineteenth century is deserving of close scrutiny. It was 60 years before that Stuart had published his "Antiquities of Athens". In the interval much Hellenic knowledge had been circulated and absorbed. Public opinion had slowly come to an acceptance of the Greek refinement and dignity. The exponents of the Greek phase now devoted their whole attention to the transformation of Hellenic art to England. The movement by 1820 had gathered full momentum. In America the Greek temples were faithfully reproduced, ranging from monumental state edifices to the most humble domiciles. In England this was never attempted for the private dwelling and only in rare instances for public buildings. The British version was a combination of Roman planning with the Greek orders, and a not unhappy ensemble often resulted. The Palladian features of the preceding period disappeared, but the magnificence of Roman compositions, together with such features as its domes, were retained. However, the true simplicity of Greek architecture is found wanting. This is exemplified in the interiors where the Greek orders are found surmounted by vaulting and domes. In the churches, the fine spires of Christopher Wren were retained, clothed in Greek detail, and this apparent incongruity evolved many

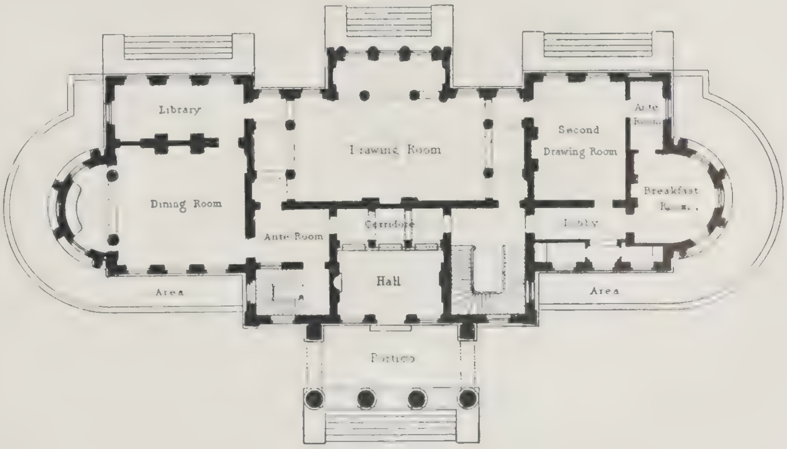


Preliminary Design for the Fishmongers' Hall, London
By Henry Roberts, 1831. The Parthenon boldly and bodily adapted to an imposing site overlooking the Thames; the extreme realization of the phase

chef-d'œuvres of the Greek phase.



Villa in Belgrave Square, London
H. E. Kendall, Architect, 1826. From "Public Buildings of London," by Pugin and Britton

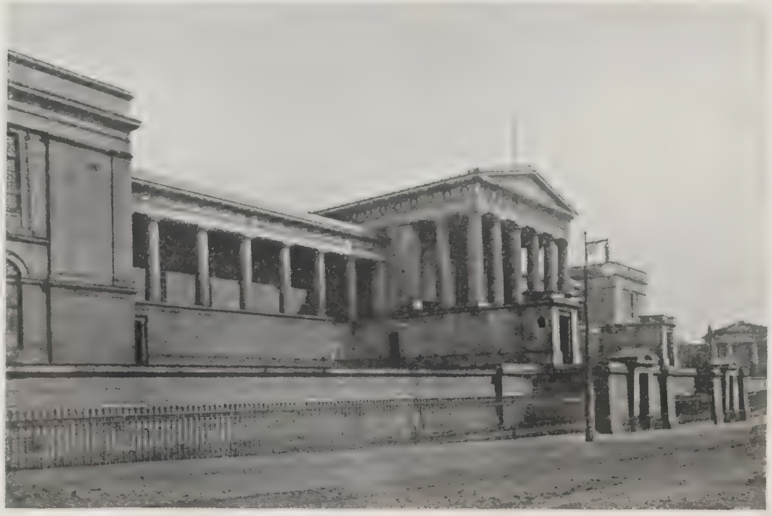


Plan of Villa in Belgrave Square, London

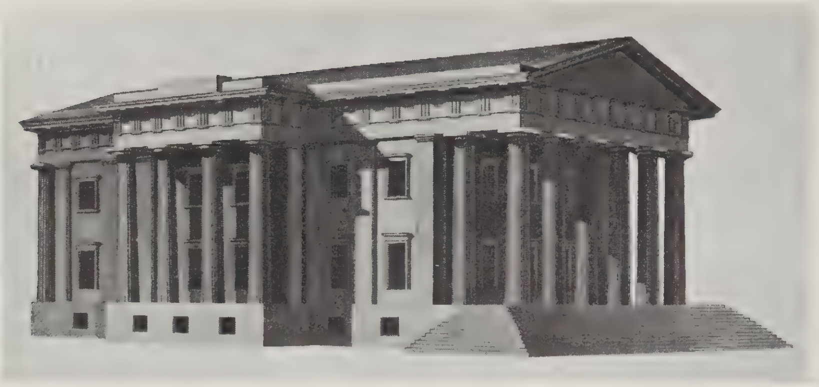
It is interesting to note the natural misstatement Mr. A. E. Richardson makes in his excellent work "Monumental Classic Architecture in Great Britain and Ireland in the XVIII and XIX Centuries". To quote, "In consequence, by the year 1820 the Greek phase was fairly established in England, to react to a great extent on the architecture of Europe and America." His misconception regarding America, no doubt hastily assumed, is clearly proved in the preceding article upon the classic revival ("The American National Expression," in The Architectural Forum for February). I further very much doubt the influence upon France, whose architecture had already been revolutionized upon classical lines by Napoleon. Moreover, the French archæologists in their researches at Athens anticipated Stuart & Revett by three years. Even in the heyday of the phase the true spirit of Greek architecture was never assimilated except in individual instances. In fact there was a constant striving in the opposite direction, which resulted in much original expression of great merit. This attitude is expressed by an excerpt from Mr. Richardson: "The enthusiasm for refinement in architecture and the kindred arts grew apace, and though excess of zeal prompted some exponents of 'Greek' to literally reproduce the temple frontals of Greece, on the whole the development was steady".

William Wilkins (1778-1834), associated with J. P. Gandy-Deering, designed in 1827 the University College of London, a chaste design, but illustrating the inclusion of the dome, thereby very much detracting from the beauty of the ensemble. In 1824 Sir Charles Barry designed and erected the art gallery at Manchester, a Greek adaptation to modern use without incongruous features.

To Sir John Smirke belongs credit for being the first architect to boldly combine Greek monuments with Roman planning. This is exemplified in his design of 1825 for the British Museum, in which his central portico is composed of eight Ionic columns in a thoroughly Greek manner. The facade in its entirety, however, becomes monotonous with its myriads of columns unbroken by contrasting surfaces. In his design for the General Post Office, London (1824-1829), with a chaste adoption of Greek forms, he has avoided this monotony. In 1825 he built Belgrave Chapel, a design of merit, exhibiting the restraint and simplicity of true Greek spirit. Unfortunately, this lovely little chapel has recently been demolished. Sir John Smirke's influence for a truer Greek interpretation throughout the country was considerable, and he stands out as one of the important as well as determining factors of the time.



The High School, Edinburgh
By Thomas Hamilton, 1825. This building creates the impression of its character being appropriate to its environment



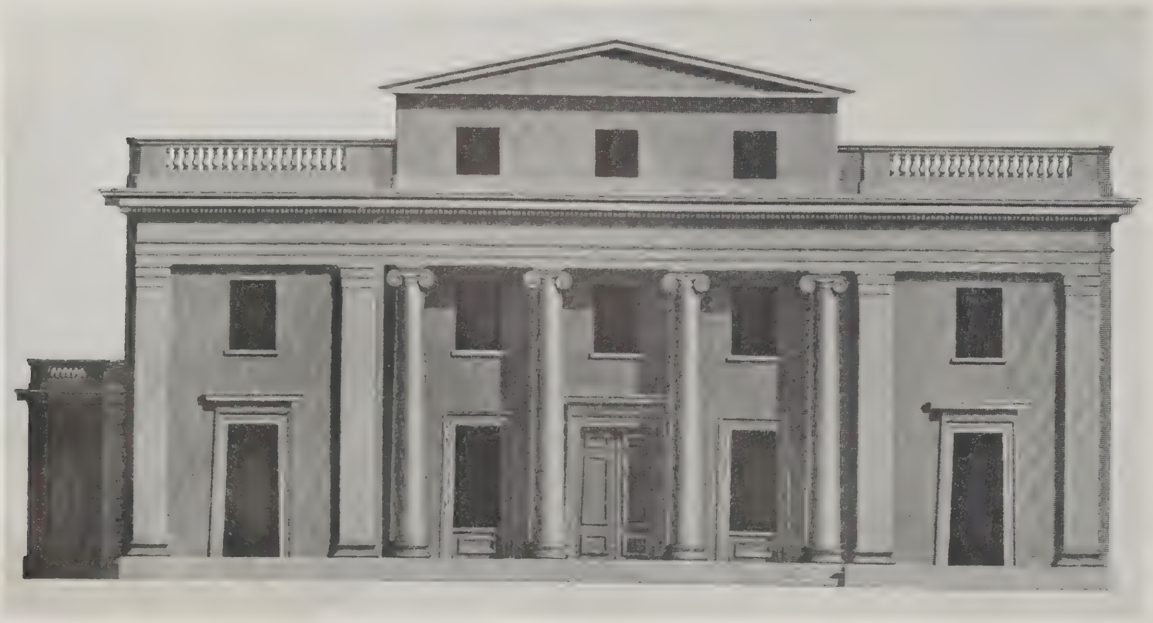
Design to Elucidate the Style of Grecian Architecture

From "Plans and Views in Perspective with Descriptions of Buildings." By Robert Mitchell, 1801. Here the temple form is adapted for domestic purposes as in America, but the author had no idea of its being executed, as he writes: "For a design, confined to the simple plan of the Grecian Temple, would be found as inapplicable to a modern mansion, as the Greek tragedy has been experienced to be unfit for the English stage"

In England as in no other country this period produced delightful churches. There was no other type of building so well expressed in Greek terms, and strangely enough their problem was a formidable one of the vertical spire in direct opposition to the predominant horizontal lines of Greek architecture. In his rendering of this problem the Englishman produced his masterpiece of the century. He combined with great skill and freedom the Greek temple with the fascinating spires of the preceding century. There was thus created a jewel possessing monumental dignity. There is not the least feeling of incongruity in these pleasing spires clothed in Greek detail which only seem to accentuate the composition of the Greek porticoes under them. Such a church is St. Pancras' (1819-1822) by the Inwood brothers. It is the essence of beauty and a tribute to English taste. The extreme realization of the phase was attained in a design by Henry Roberts in 1831 in which he boldly adapted the Parthenon upon an imposing site overlooking the Thames. It was a bold, monumental conception, but too radical for the English temperament and was ultimately abandoned for a scheme reminiscent of the work of the Adams.

While the Greek school was gaining adherents in London many provincial architects were quickly taking up the movement and erecting interpretations throughout the kingdom. In 1822 Francis Goodwin constructed the assembly rooms in Manchester, which compared favorably with the work of the London architects. Edinburgh offered a more fertile soil than London for the seed of Hellenic art, and was the "Modern Athens."

A remarkable feature of the time was the great number of architects who traveled to Greece and Rome to complete their studies. Of the prominent men nine out of ten had this advantageous opportunity, which directly influenced architecture of this style. These students, after viewing and realizing the grandeur and magnificence of Roman antiquity, were not satisfied with merely Greek temples. To a man their conception of a great modern architecture was a combination of Greek simplicity with Roman magnificence, and this constant use of the Greek order upon a Roman plan is strongly mirrored throughout the revival. Furthermore, these traveled architects were so thoroughly familiar with the three Greek orders that the orders were employed from the first without preference or in any traceable sequence such as was discernible then in America.



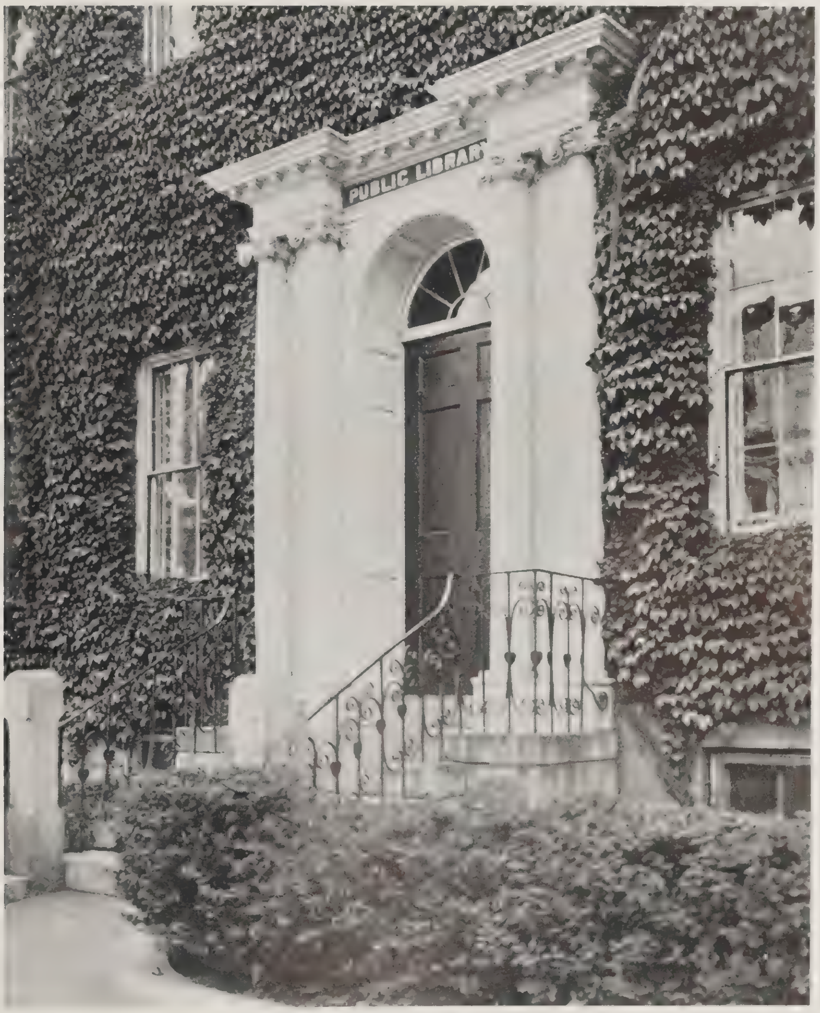
House Erected for General Taylor in Ireland

From "Plans of Buildings, Public and Private," by David Laing, 1818. It illustrates the radical difference in domestic work between the English and the American phases

# DETAILS OF EARLY AMERICAN ARCHITECTURE

### A SERIES OF MEASURED DRAWINGS

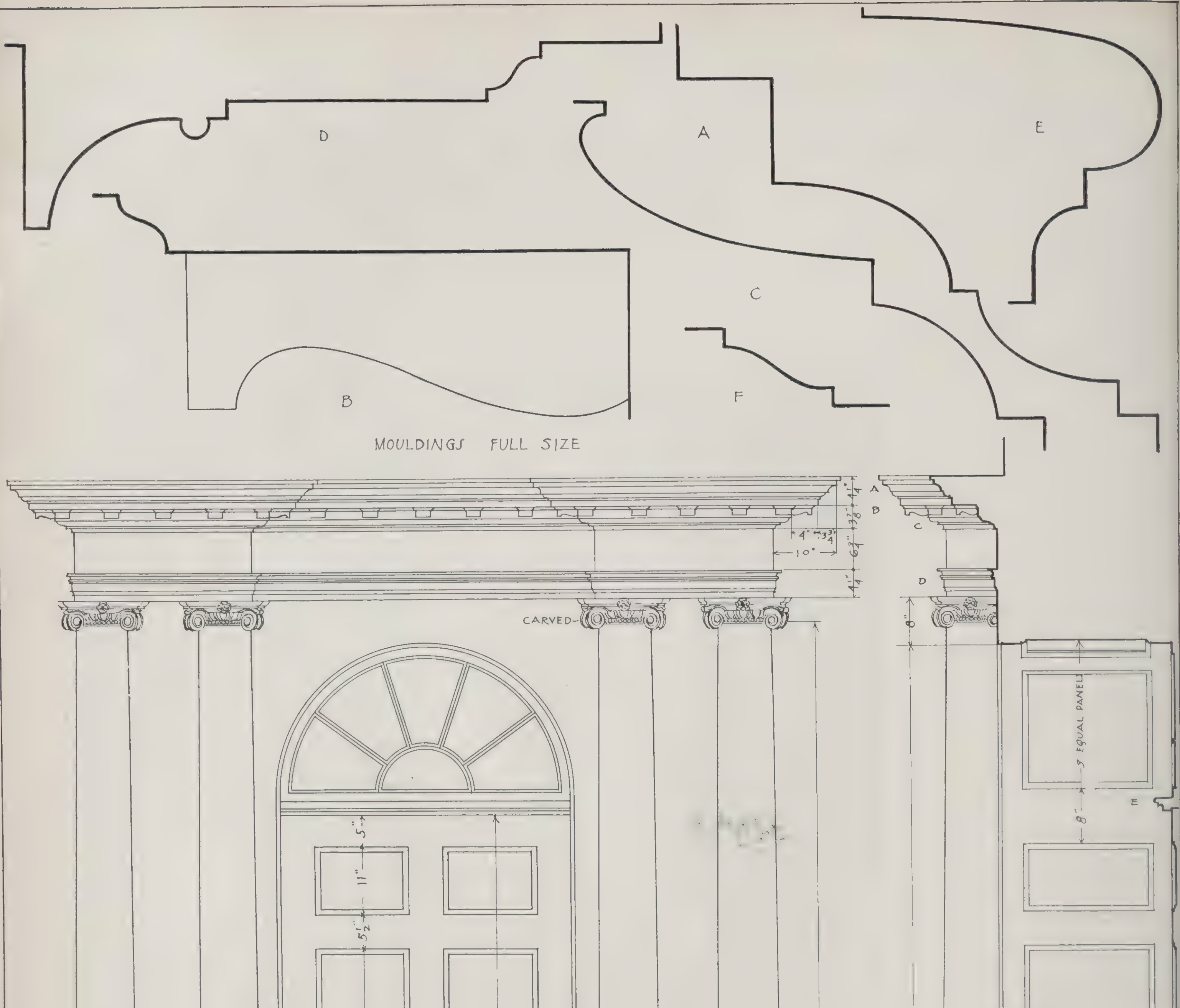
*By* GEORGE H. HIGGINS



DOORWAY, PUBLIC LIBRARY, PORTSMOUTH, N. H.

NOTWITHSTANDING the destruction of excellent examples of architecture which goes on unceasingly, a surprising number manage to survive. An old building may outlive its usefulness for its original purpose and then be converted to some other use, its very excellence indeed being sometimes the reason for its preservation. This is true of the structure designed by Charles Bulfinch and erected in 1806 for the Portsmouth Academy, which later became a school and later still a public library.

The main doorway of the building, which is its most admirable architectural feature, is quite representative of Bulfinch's most graceful work. The pediment is supported upon four engaged columns, and one detail which is incorporated in many of Bulfinch's structures is found in the agreement of the paneling of the door with that of the reveal caused by thickness of the red brick wall, the arch framing the transom arranged in three panels.



·PLATE·48·
·MARCH·1924·

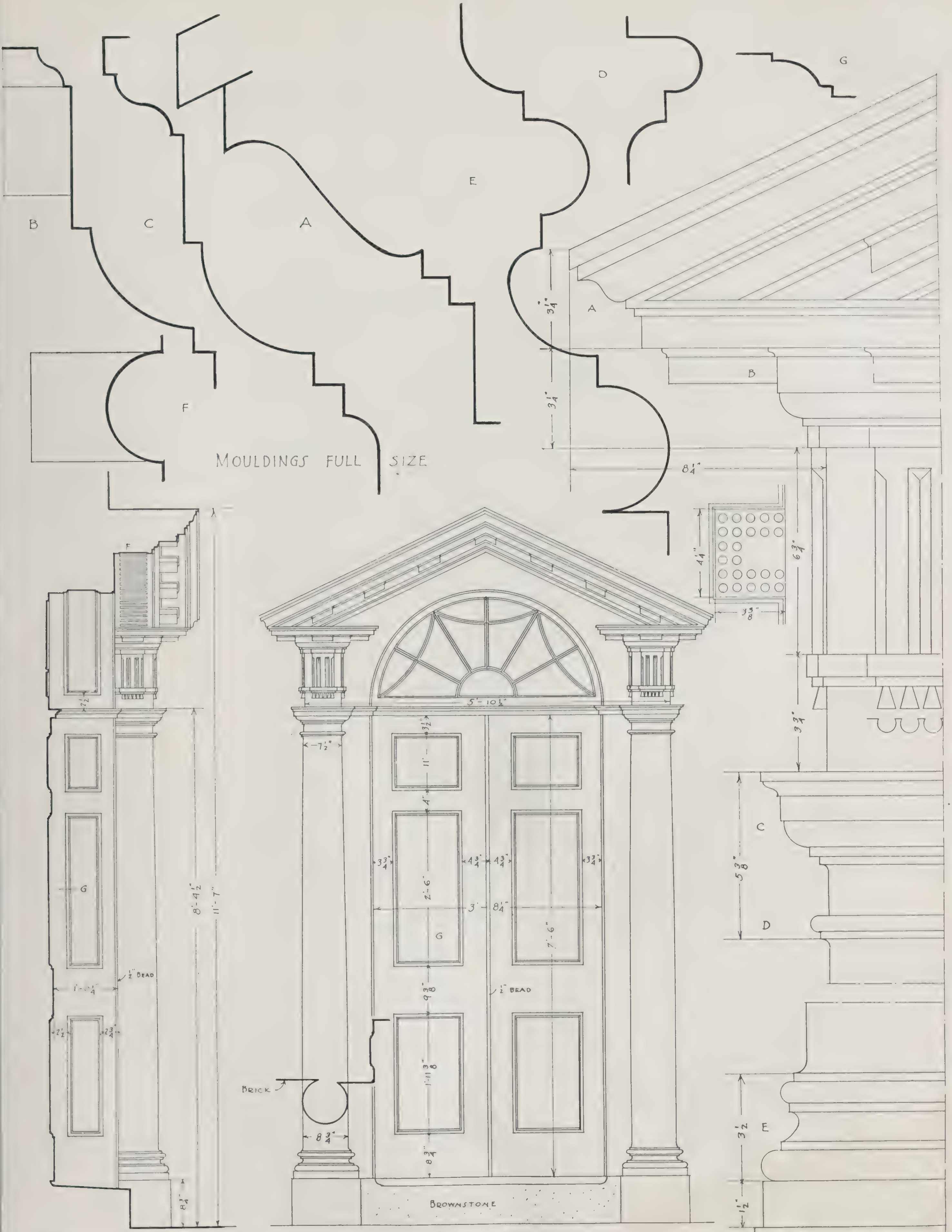
# LIBRARY ENTRANCE

PORTSMOUTH · N · H

CHARLES BULFINCH ARCHITECT

BUILT 1806

·MEASURED· AND·
·DRAWN · BY·
·GEORGE·H·HIGGINS·



· PLATE · 49 ·
· MARCH · 1924 ·

# DOORWAY HAVEN HOUSE

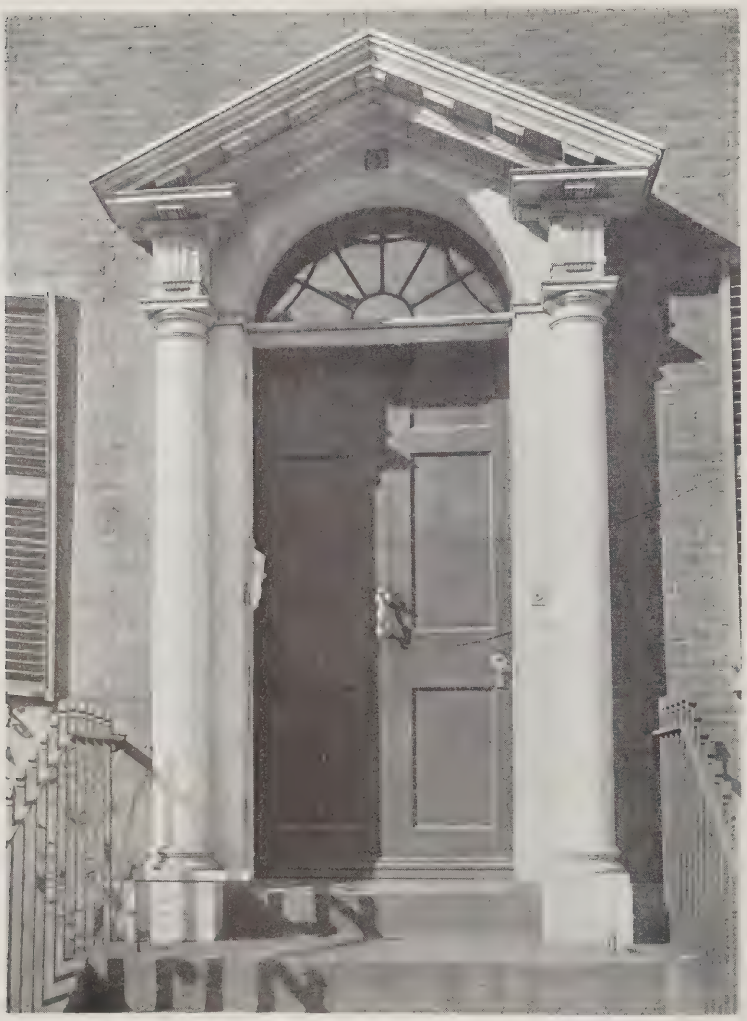
· PORTSMOUTH · N · H ·
· BUILT · ABOUT · 1810 ·

· MEASURED · AND ·
· DRAWN BY ·
· GEORGE · H · HIGGINS ·

# DETAILS OF EARLY AMERICAN ARCHITECTURE

A SERIES OF MEASURED DRAWINGS

*By* GEORGE H. HIGGINS



DOORWAY, HAVEN HOUSE, PORTSMOUTH, N. H.

ARCHITECTS of the Colonial and early Federal periods excelled in the designing of their doorways. Ornament indeed was generally confined to use upon the cornice of a building and its main doorway, with the chief effort lavished upon the doorway.

The entrance to the Haven house is among the most interesting to be found even in Portsmouth, an old town which is rich in architecture of the earlier periods. Worked out in a scale appropriate for wood, the doorway is framed by a pediment which encloses the transom and by two engaged columns which support it. The transom is given a design which is one remove from the austerely simple, and the door is paneled with six panels in three sizes which Bulfinch apparently regarded with especial favor since it is used in much of his work. One minor but graceful detail is the continuing of the line between doorway and transom into the capitals of the columns.

# A Majorcan Loggia Ceiling

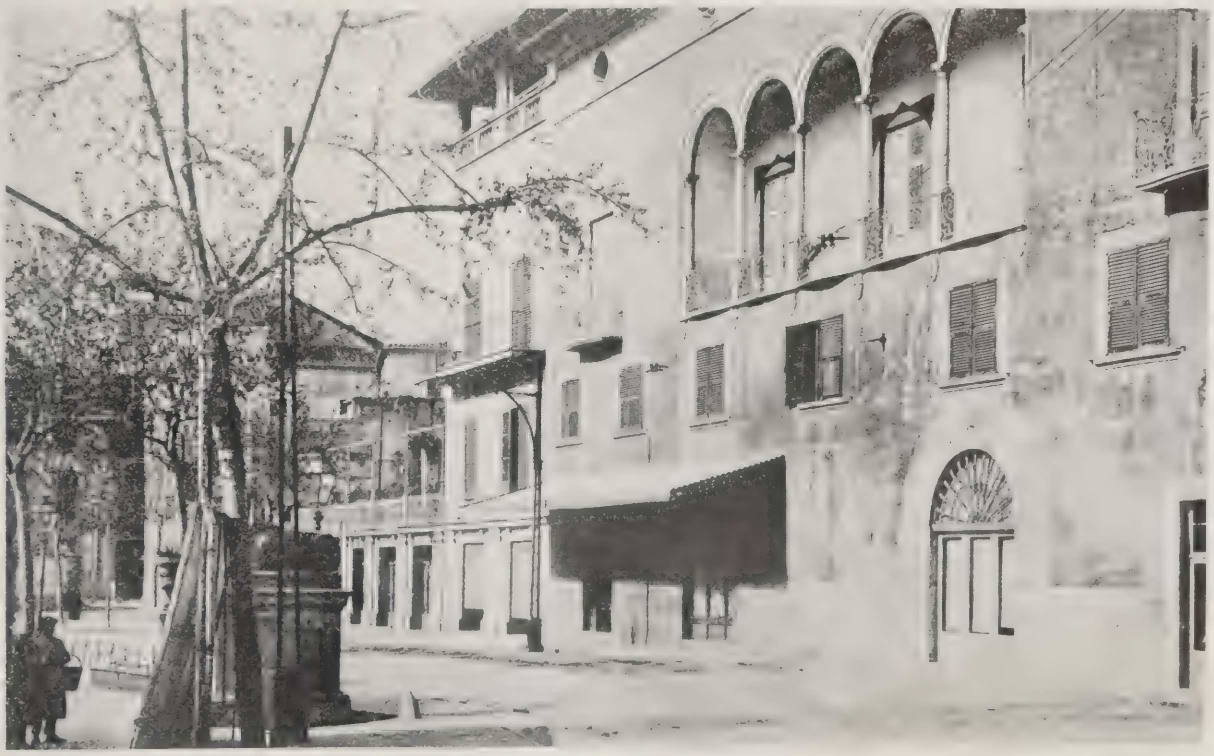
*By* GORDON ALLEN

AMONG the thousands of American tourists returning each autumn from Europe you will find few who have visited Spain, fewer who have been to the Balearic Islands, and not many who know more than vaguely where they are. A comfortable night's journey on the cleanest boats in the Mediterranean takes you from Barcelona to Palma, the capital of Majorca, the largest of the three islands and one of the most interesting towns of Spain, with a magnificent Gothic cathedral, any number of palaces of the fifteenth, sixteenth and seventeenth centuries, and on the mountain slopes outside the town many delightful villas in settings such as you associate with Sicily, Sorrento or Capri.

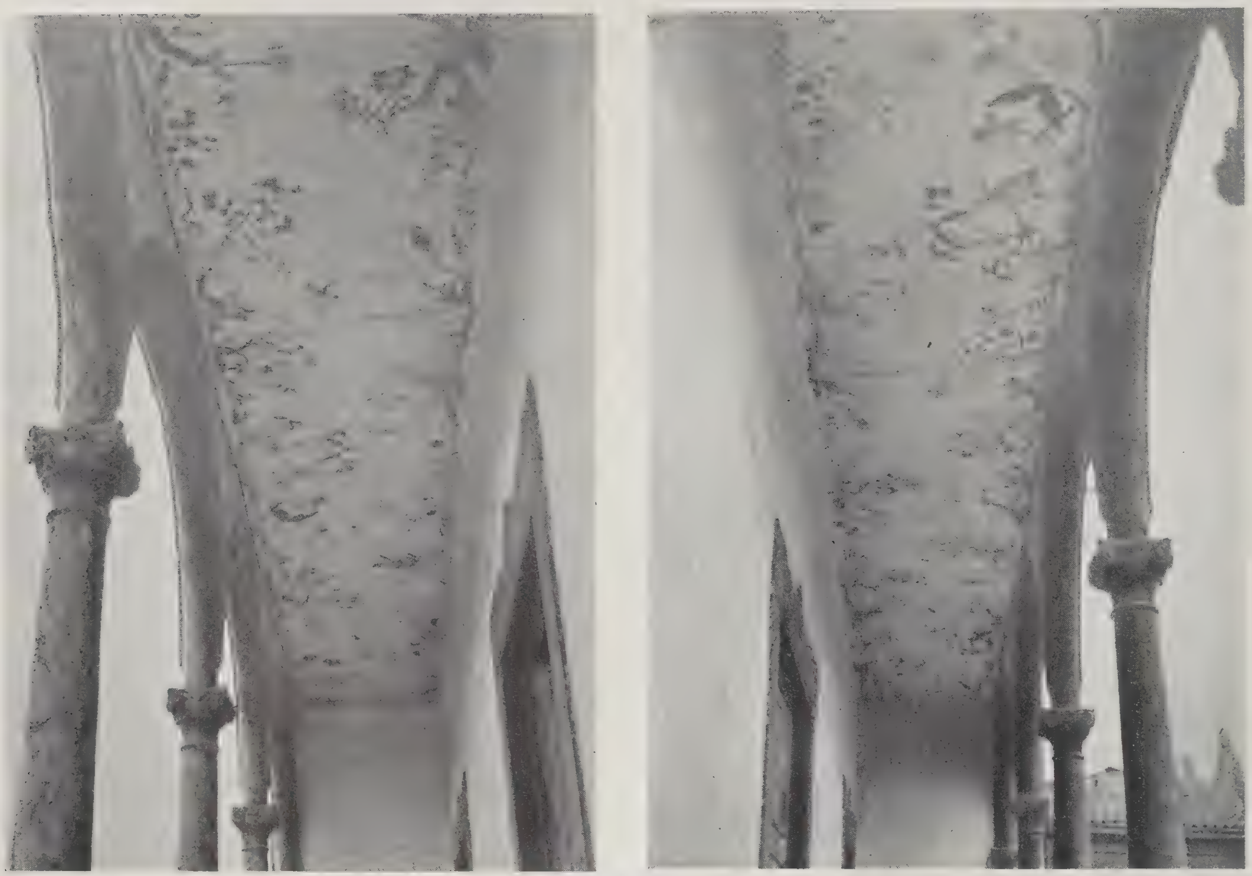
The palaces in Palma are none of them very large, but every room contains something of delight—a set of leather covered Spanish chairs, a fifteenth century tapestry, a kitchen floor and wainscot of the most charming colored tiles in the world, or, as in one case at least, a complete *vernis Martin* dressing table with mirror and innumerable boxes and brushes to match, all exquisitely designed to suit the vanity of some eighteenth century Spanish beauty.

Perhaps the finest of the Palma palaces is the Casa del Marques de Sollerich, facing on a wide street which forms the principal boulevard of the town, where every evening in fine weather the *paseo* or promenade takes place, and, as in every Spanish town, eligible young ladies with their mothers or *duennas* stroll up and down for an hour or two, greeting their friends with a sedate bow and a flash of dark eyes from under their black lace mantillas. Overlooking this wide street, on what we should call the second story of the house, and opening out from the imposing drawing room, is a delicate loggia of five arches with slender columns of warm yellow marble reaching to the floor, and curved iron balconies of the Louis XV period, from which are hung on *festas* the most gorgeous crimson and magenta brocades. The eighteenth century decorated ceiling of this loggia is one of the most delightful examples of *Chinoiserie* to be found anywhere, and certainly the most important—if such a word may be used for so airy and fanciful a decoration—in Spain. It has the whimsical charm of the old toiles de Jouy, or other eighteenth century French designs for printed cottons, together with the imaginative quality of the panels in the *Singerie* at Chantilly, or the famous screen in the Musee Jacquemart-Andre in Paris. It is entirely "free design"—that is, there is no pattern or repetition, and except that the composition is extremely studied and balanced, there is no regularity whatever.

It is not a *soffito* design, in the sense that one is supposed to be looking up at sky or architectural features shown in perspective, as in the ceilings of Tiepolo or Michaelangelo; each border line is treated formally as a horizon, so that to study the four sides separately one has to assume four different positions. The background is a warm gray, the color of the

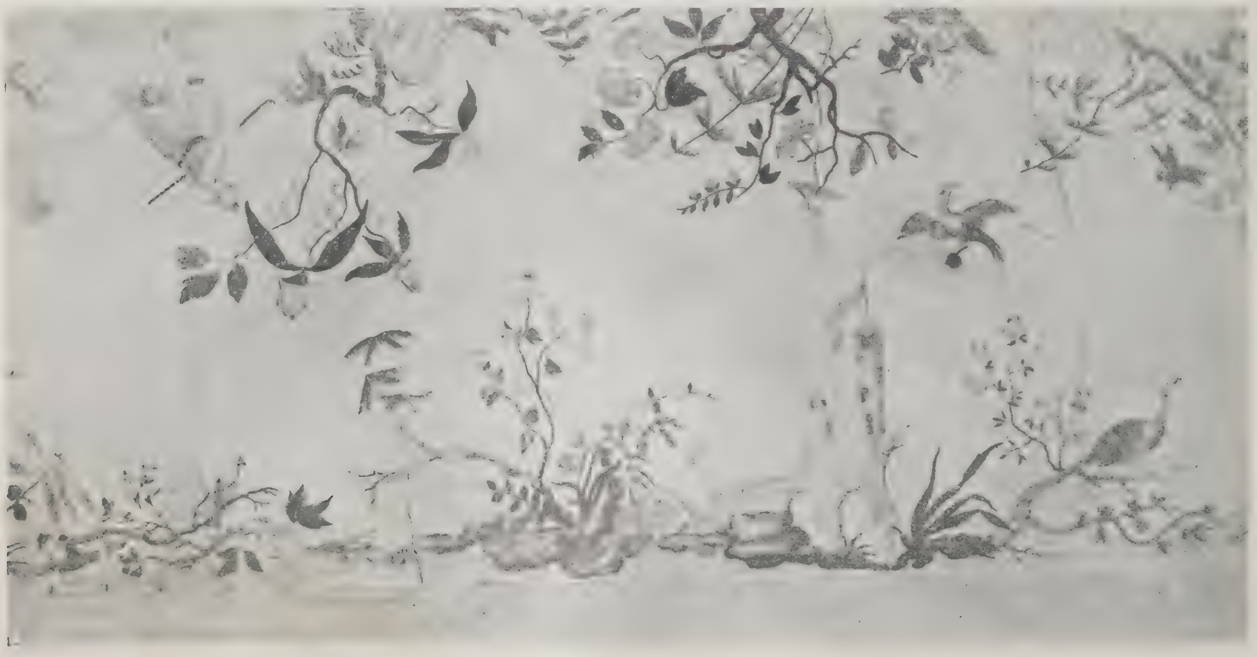


Street Facade of Casa del Marques de Sollerich, Palma, Majorca



Opposite Ends of Painted *Chinoiserie* Decorations on Loggia Ceiling
Casa del Marques de Sollerich, Palma, Majorca

plaster; on each side are painted gnarled trees, birds, and Chinamen in various postures, with one or two bits of Chinese architecture, or at any rate the eighteenth century European conception of it. The colors are few and simple—a clear but dull green, burnt siena, and a red like that of Chinese lacquer but somewhat less brilliant—all on the quiet gray background of the plaster "sky." With all its freedom of treatment it is not restless in the least, and nothing I can imagine could be more pleasant than to lie in a long Chinese chair on such a loggia and to lift one's eyes from a book to such a ceiling!



Detail of Painted *Chinoiserie* Decorations

# DECORATION & FURNITURE

## Interior Details from Hotel Gouthiere, Paris

### EXAMPLES OF THE PERFECTION OF LATE LOUIS SEIZE DECORATION

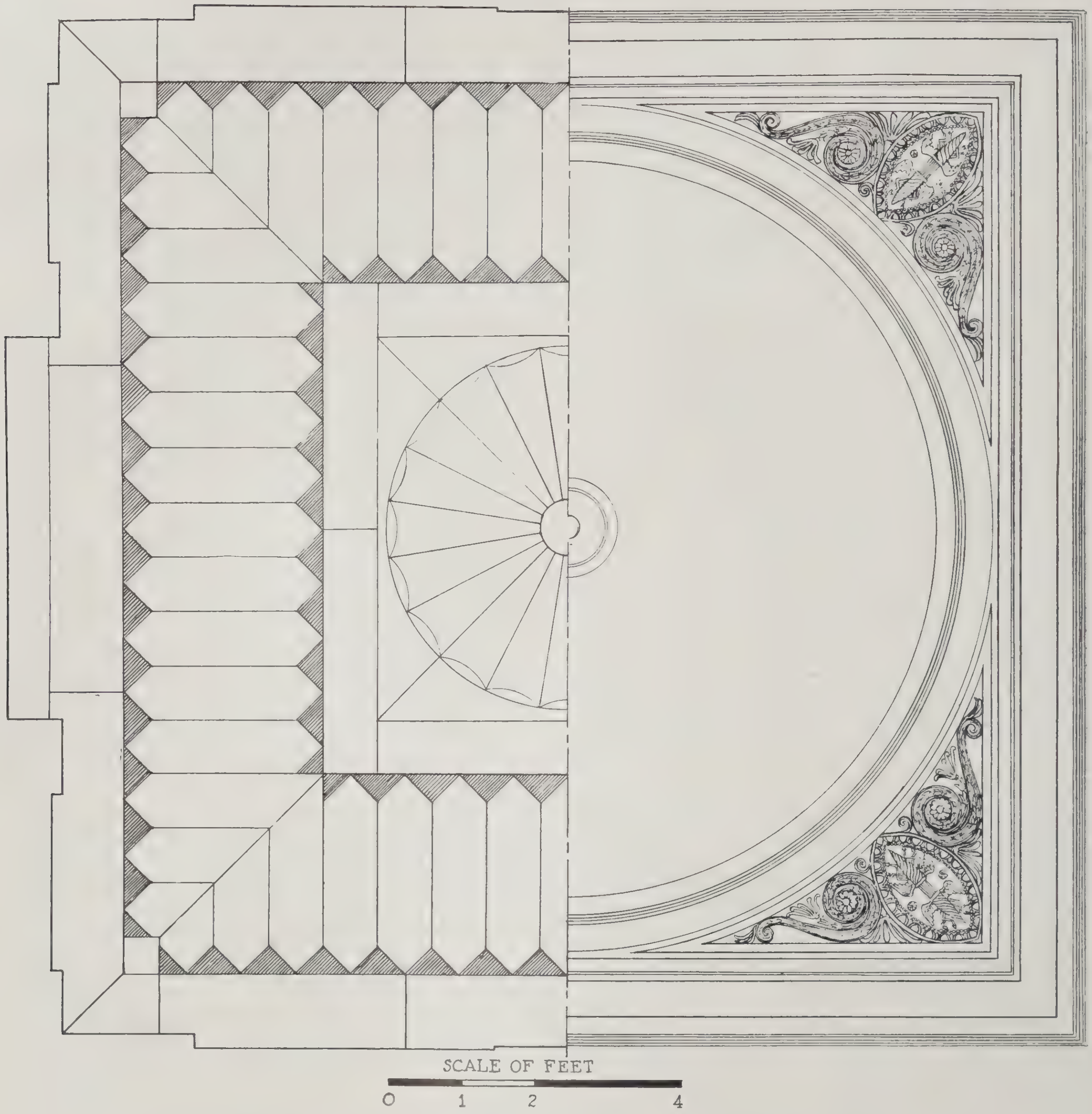
AT No. 9 Rue Pierre-Bullet in Paris, originally a street of exclusive residences, long since abandoned to small tradesmen, still stands the exquisite little hotel built during the latter part of the reign of Louis XVI by the famous craftsman Pierre Gouthiere. Together with Boule, the name of Gouthiere has come down in the history of French decoration as that of a consummate artist in his craft, endowed with an innate appreciation and understanding of the masters in metal of the Italian Renaissance, whom he equaled in beauty of design and skill of execution.

This artist enjoyed great prosperity and popularity under the patronage of Louis XVI and his luxurious court and the effete aristocracy before the Revolution. His decorative sculptures and designs in gold and bronze and brass, used so extensively to embellish household utensils, furniture and woodwork of the Louis Seize period, placed him among the foremost artists of his day. His genius, employed by such arbiters of exacting taste as the Duke d'Aumont and Madame Du Barry, was allowed but a brief opportunity to shine. Like many of the artists, designers and craftsmen, who through the patronage of king and court built up in France to a point of perfection and beauty never equaled before or since all branches of the arts and crafts, Gouthiere was overwhelmed in the anguish of the Revolution.

Already ruined through his failure in 1784, and unable to collect his bills against his former aristocratic patrons, now dead or scattered, Gouthiere was abandoned to the partisans of a democratic decorative style. Suspected perhaps as a follower of the Bourbons, out of sympathy with the stiff, dry, prescribed ornament which the new regime of civilian

*Photo by Giraudon*

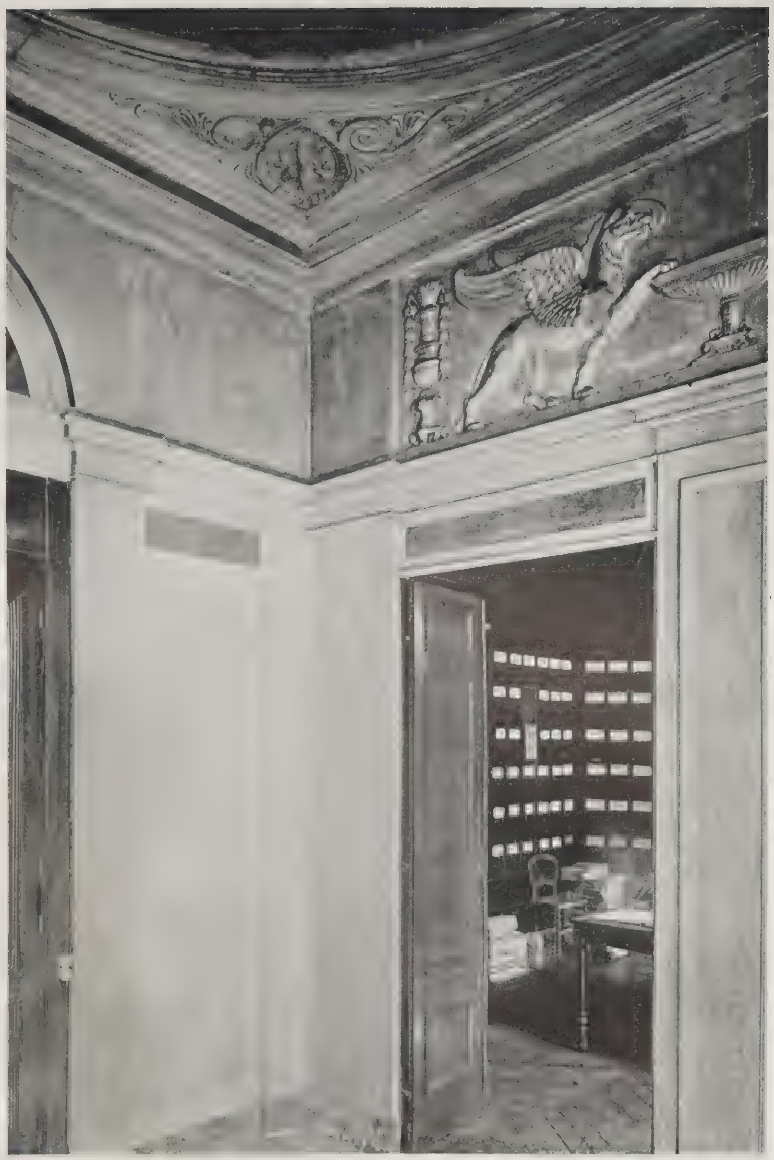
Small Salon, Hotel Gouthiere, Paris



**Half Plan of Floor and Ceiling, Vestibule of Hotel Gouthiere, Paris**
Measured Drawing by a Student of Paris Atelier, New York School of Fine and Applied Arts

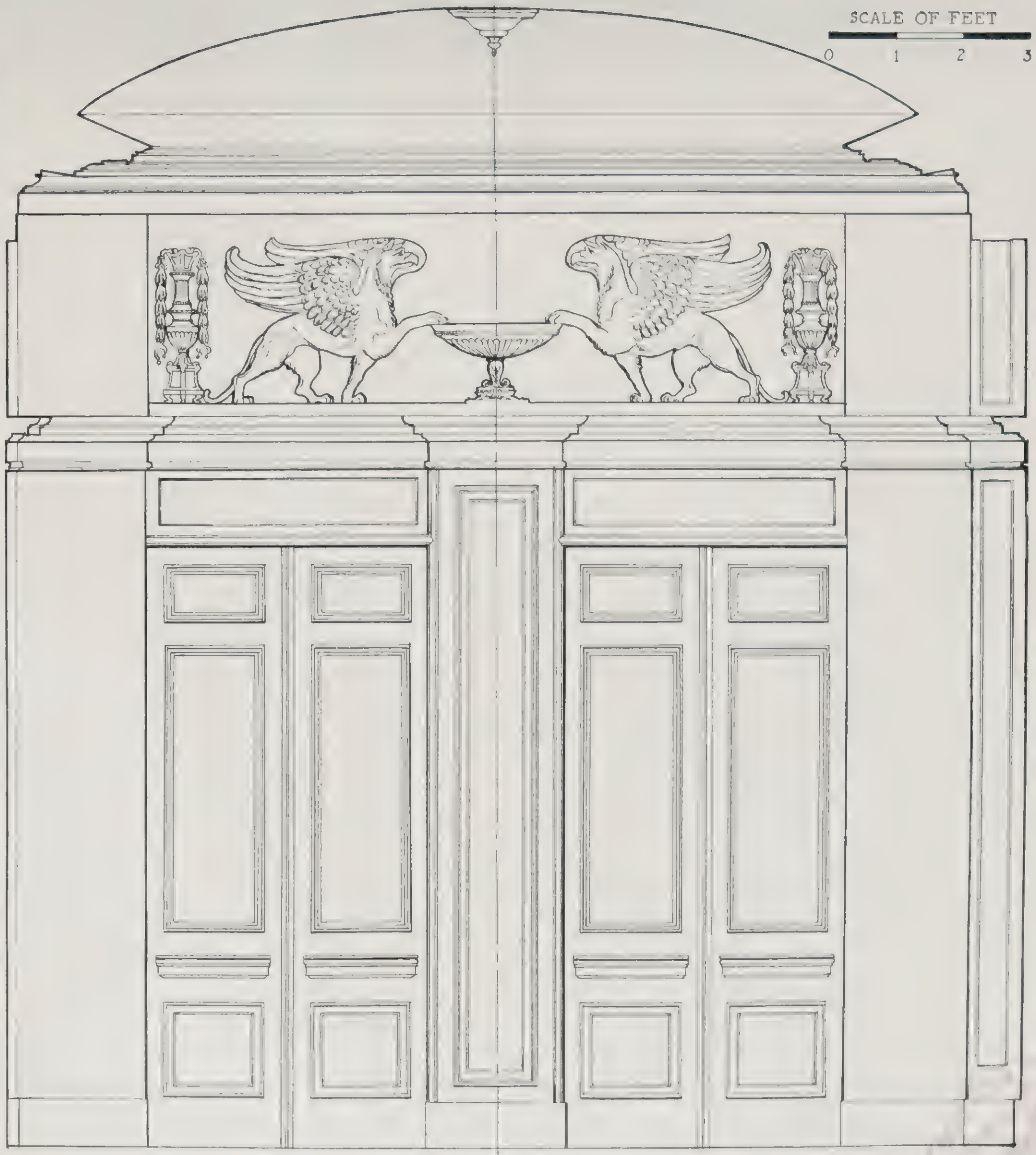
government demanded, Gouthiere disappeared from sight. He was ignored. Paris, formerly so proud of him, forgot him, and when he died in 1813 it was in a common grave she buried him, as a man unknown and unhonored. Time, however, makes amends. The genius of Gouthiere is once again recognized and acknowledged.

The street facade contains one high story and an attic. The stonework of this main story is rusticated, and crowned, as is the attic, with a cornice of much refinement and delicacy. An entrance pavilion, flanked by two bays which project from the main building toward the street, occupies the center of the design. These bays form an open court, which is largely filled by unusually broad terraced steps leading from the entrance door down to the street. Heavy pedestals surmounted by recumbent sphinxes flank the upper tier of these splendid steps. An imposing entrance door, with bracketed entablature and fine mouldings, set into a deep archway, is the only opening in the rusticated wall of the center bay. Resting on the entablature of the door and filling the arched space above it, two seated female figures suggesting Music and Poetry hold a wreath above the head of a bust representing the Goddess of Art. Set into the attic above the arched doorway of the center pavilion is an oblong panel of sculptured cupids depicting the triumph of Love. Some bear fruit, some flowers and some musical instruments; cupids dance through the entire design, surrounding the Queen of Love shown in a tiny flower-bedecked chariot drawn by two lambs.



DETAIL OF ROOM FINISH

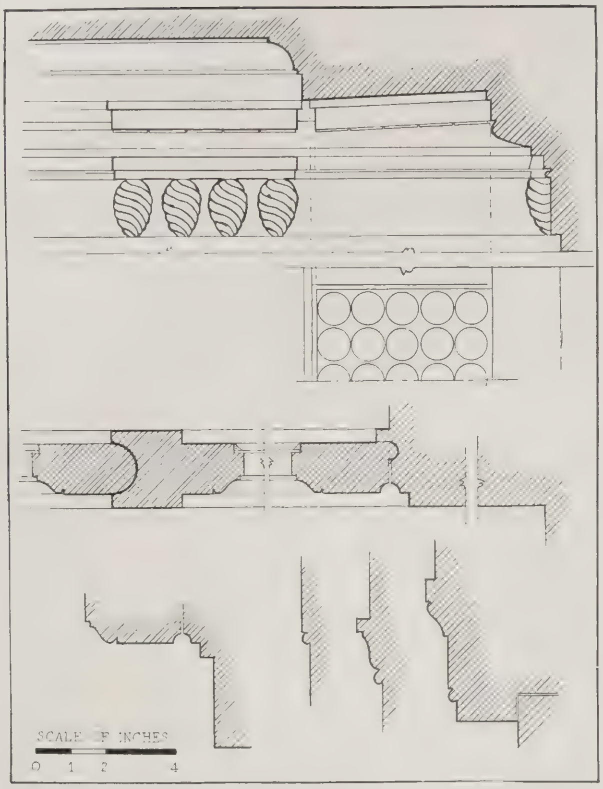
Photo by Giraudon



ELEVATION OF SIDE WALL

VESTIBULE OF HOTEL GOUTHIERE, PARIS

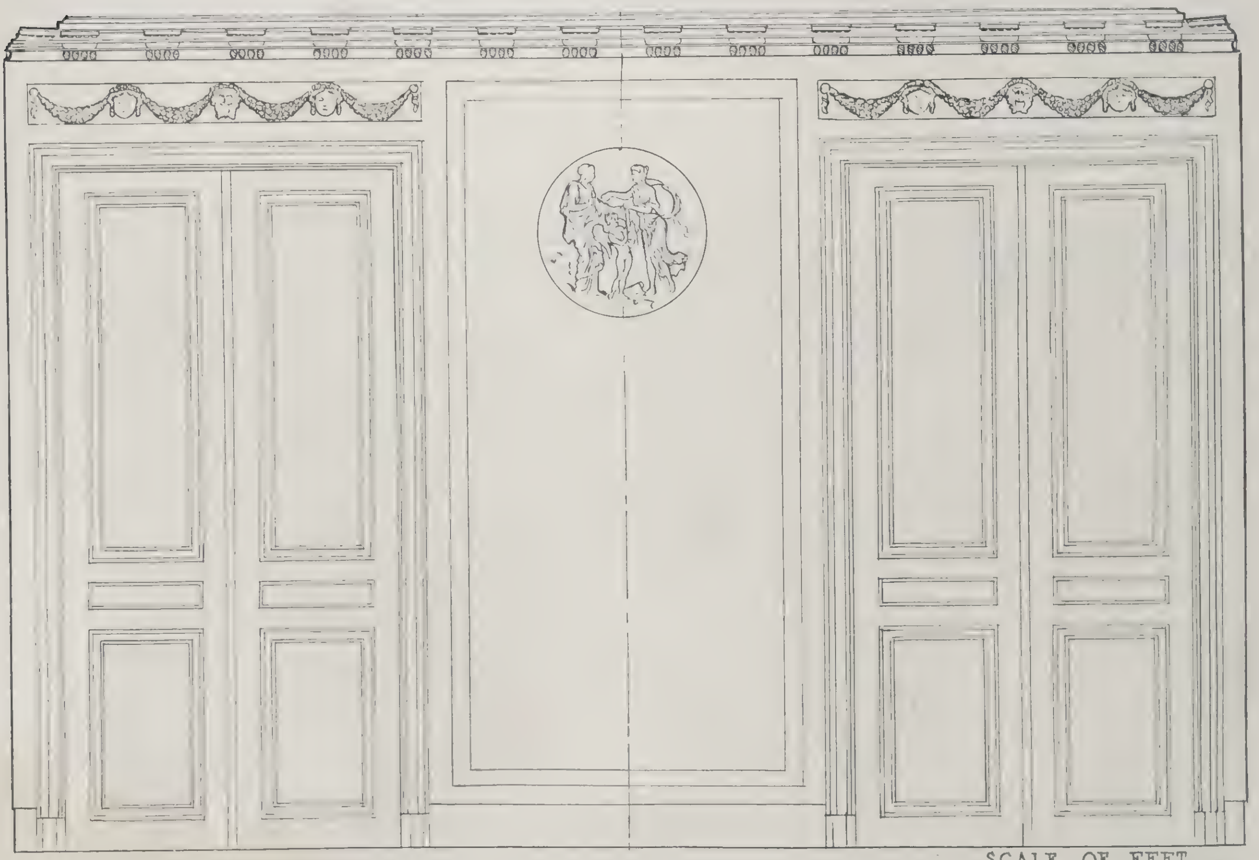
MEASURED DRAWING BY A STUDENT OF PARIS ATELIER, NEW YORK SCHOOL OF FINE AND APPLIED ARTS



Details of Cornice and Mouldings
Small Salon of Hotel Gouthiere, Paris

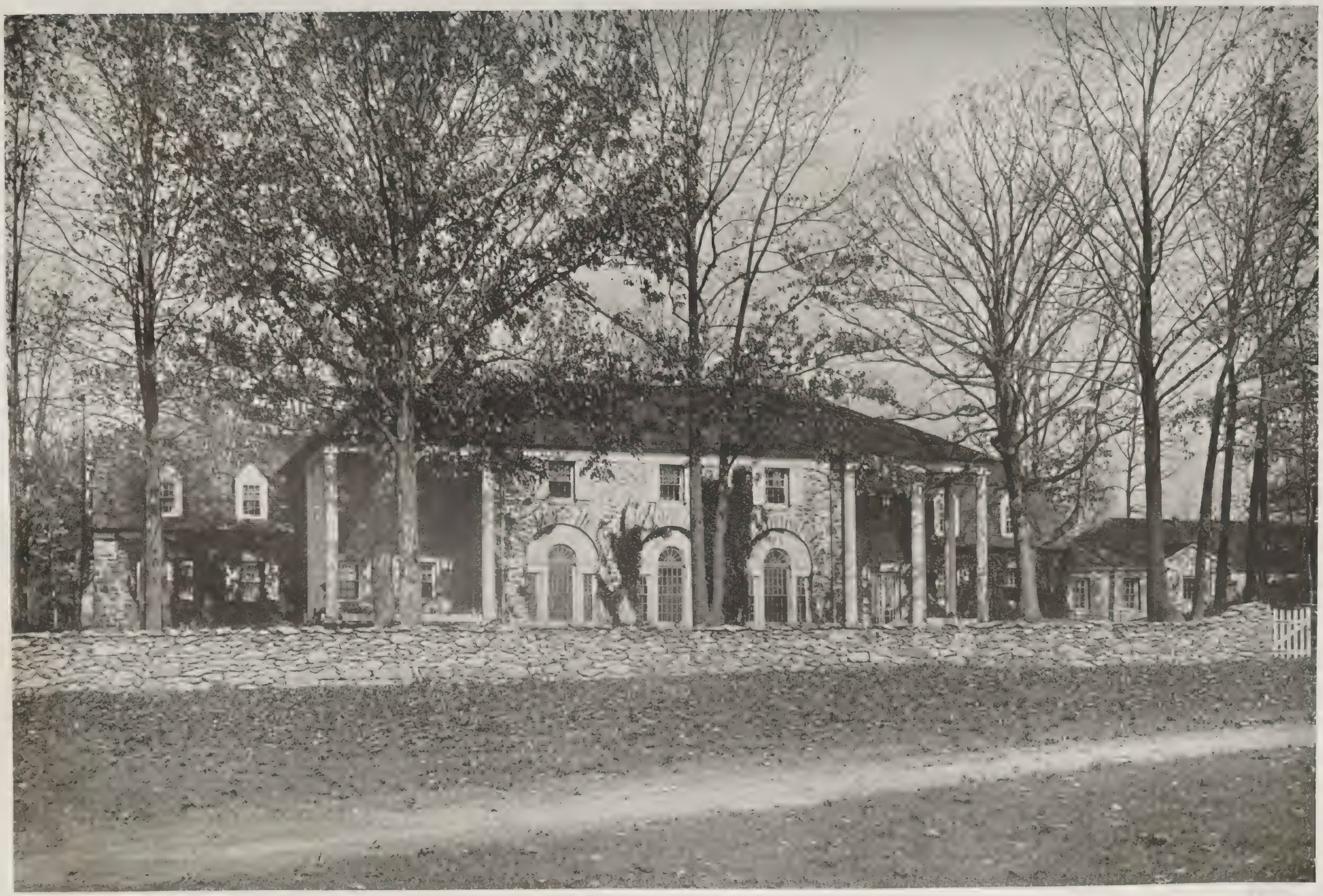
The care displayed in the scale of the exterior details is found again upon entering this house, as may be seen in the accompanying illustrations and drawings of the vestibule and small salon. In the vestibule the low relief and the carefully studied proportions of the pilasters and panels, as well as the fineness of the cap and cornice mouldings, are characteristic of the late Louis Seize period. The salon shows the same delicacy of treatment in door and wall panels and mouldings. The low cornice of this room with its mutules and guttæ is indicative of classic influence. The sizes of these rooms and the small scale of the various decorations and details are easily adaptable to modern use.

Unfortunately the illustrations give no idea of the color used in these interiors. In the salon, for example, the base is dull red marble, the walls and trim are painted rich yellow, the doors gray-green, the ceiling soft cream, and the floor is finished brown. From this brief description it is possible to visualize the glowing warmth of color displayed in this small room. With such a precedent to follow, a freer use of strong color in the interior decoration of American houses might well be employed. It is the combination of delightful color with well placed decorations and carefully studied details which gives to these rooms a unique value to students of architecture and decoration as a useful object lesson.



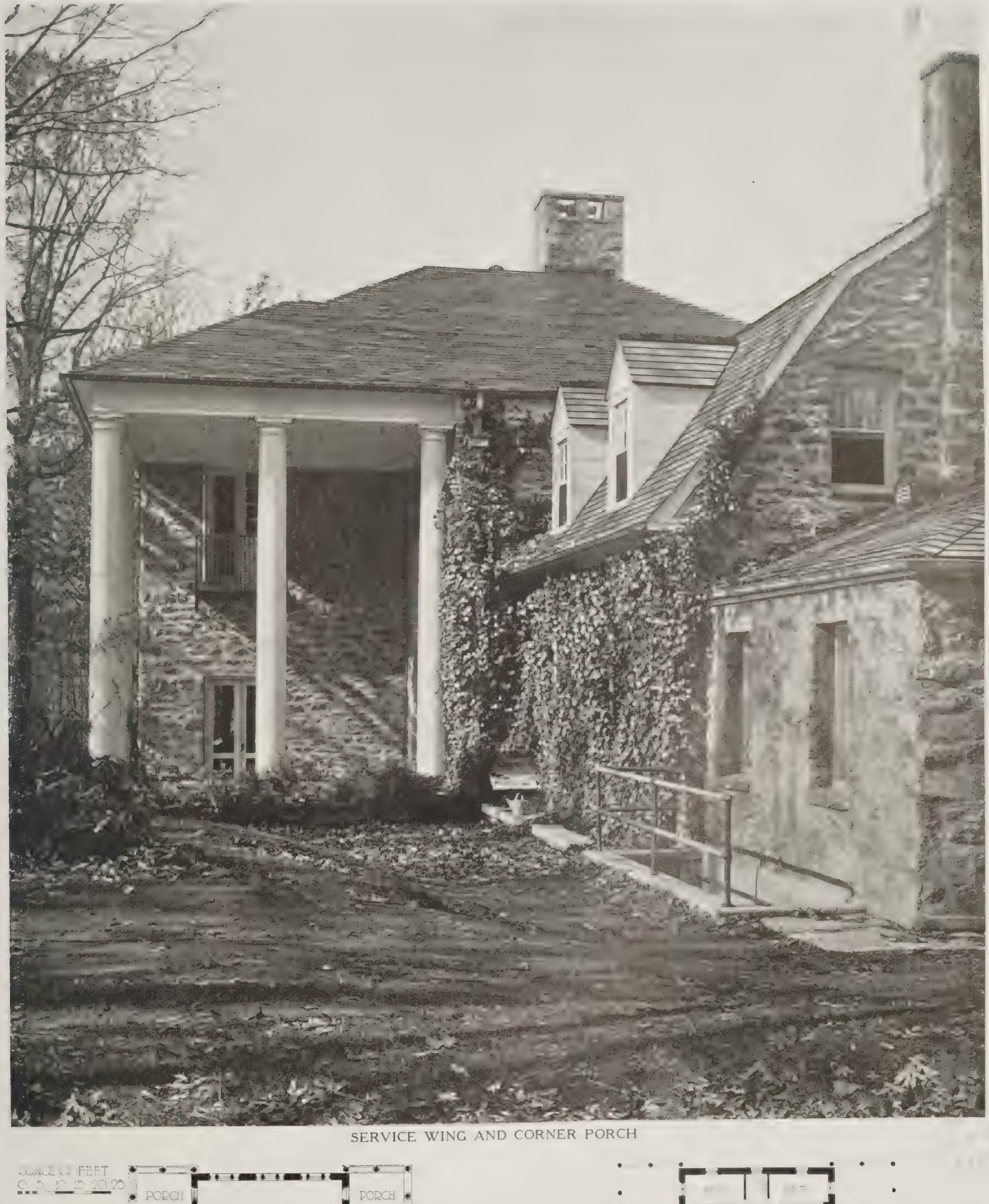
Elevation of Side Wall
Small Salon of Hotel Gouthiere, Paris

Measured Drawing by a Student of Paris Atelier, New York School of Fine and Applied Arts

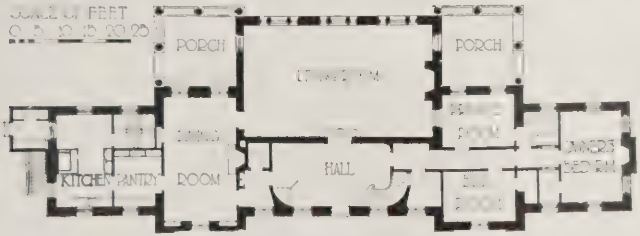


LIVING FRONT OF HOUSE, FACING PASTURE
"GOODESTONE," HOUSE AT MIDDLEBURG, VA.
GOODWIN, BULLARD & WOOLSEY, ARCHITECTS

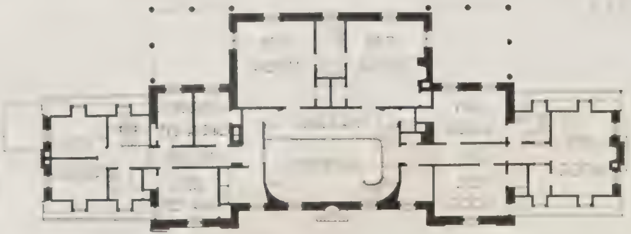
*Photos, Schuyler Carteret Lee*



SERVICE WING AND CORNER PORCH



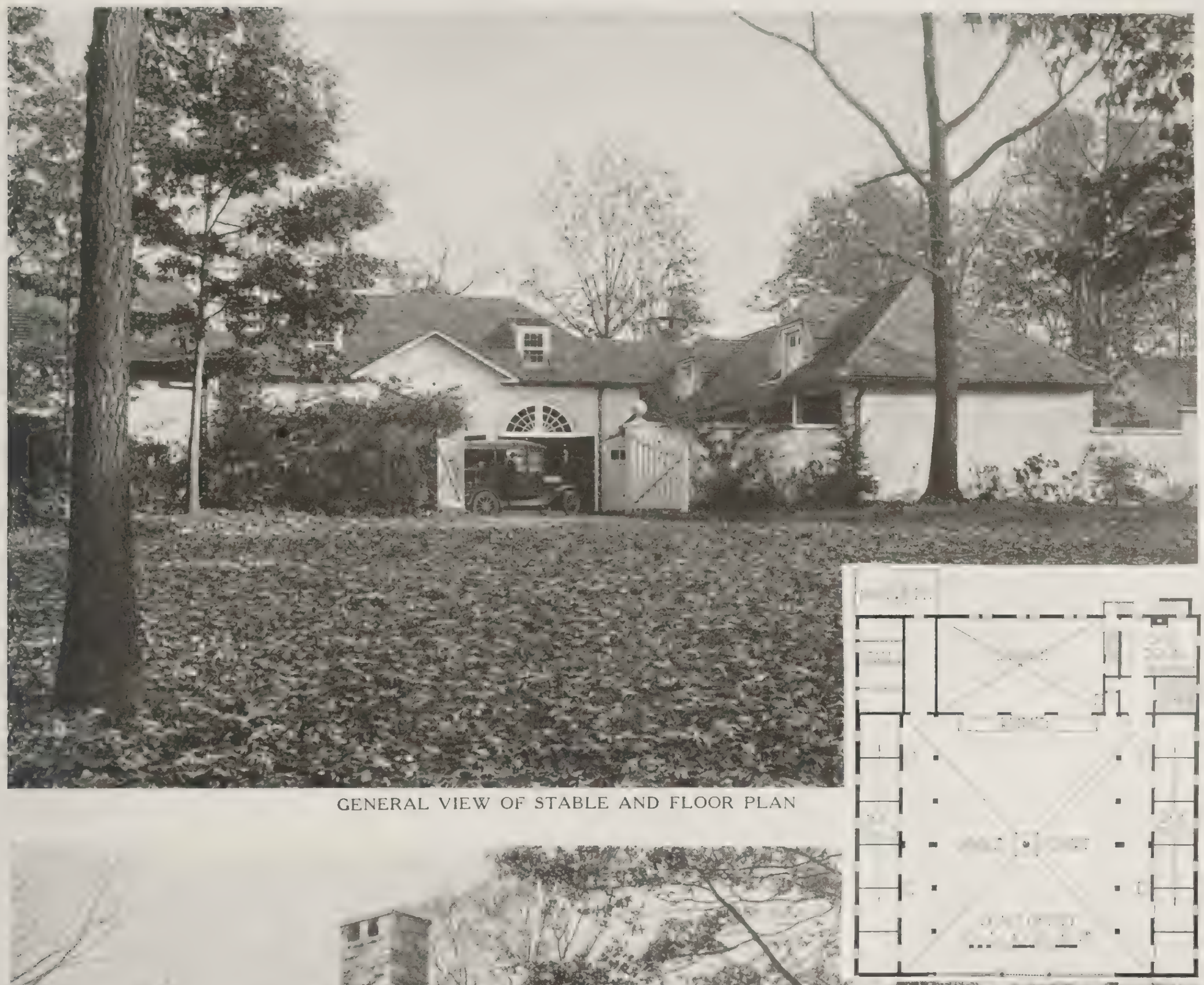
FIRST FLOOR PLAN



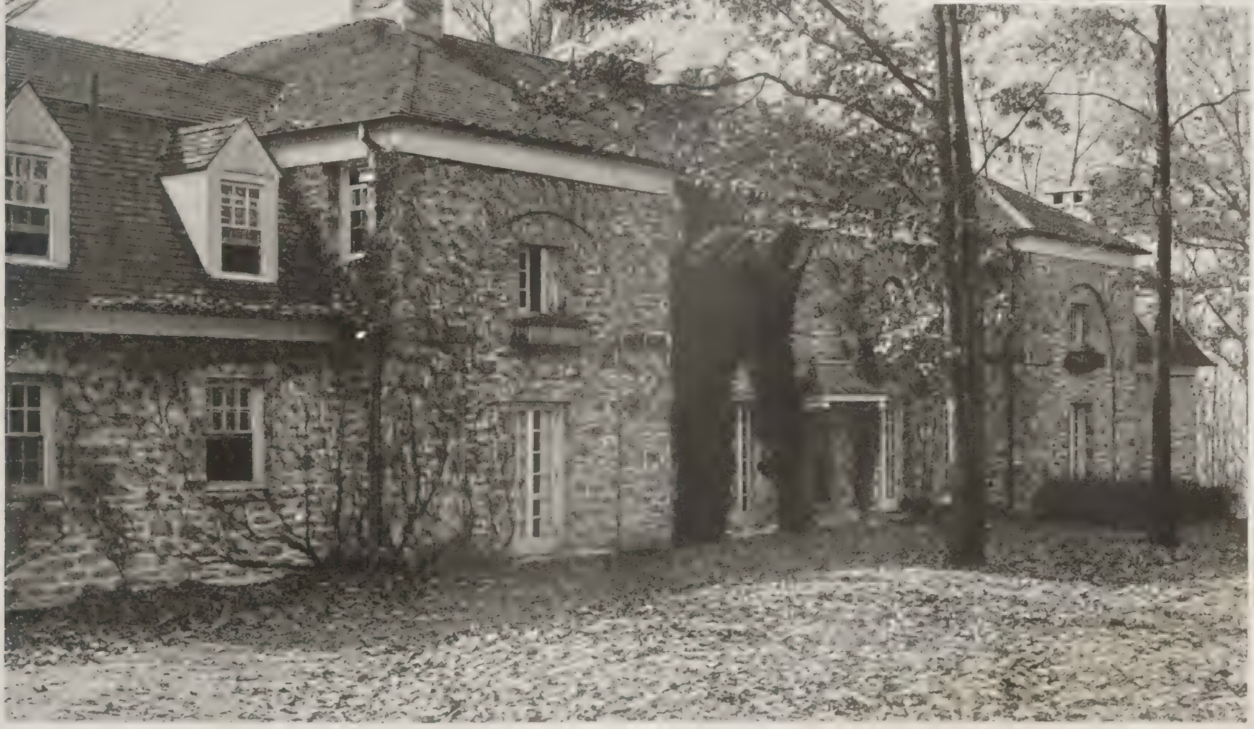
SECOND FLOOR PLAN

"GOODESTONE," HOUSE AT MIDDLEBURG, VA.

GOODWIN, BULLARD & WOOLSEY, ARCHITECTS



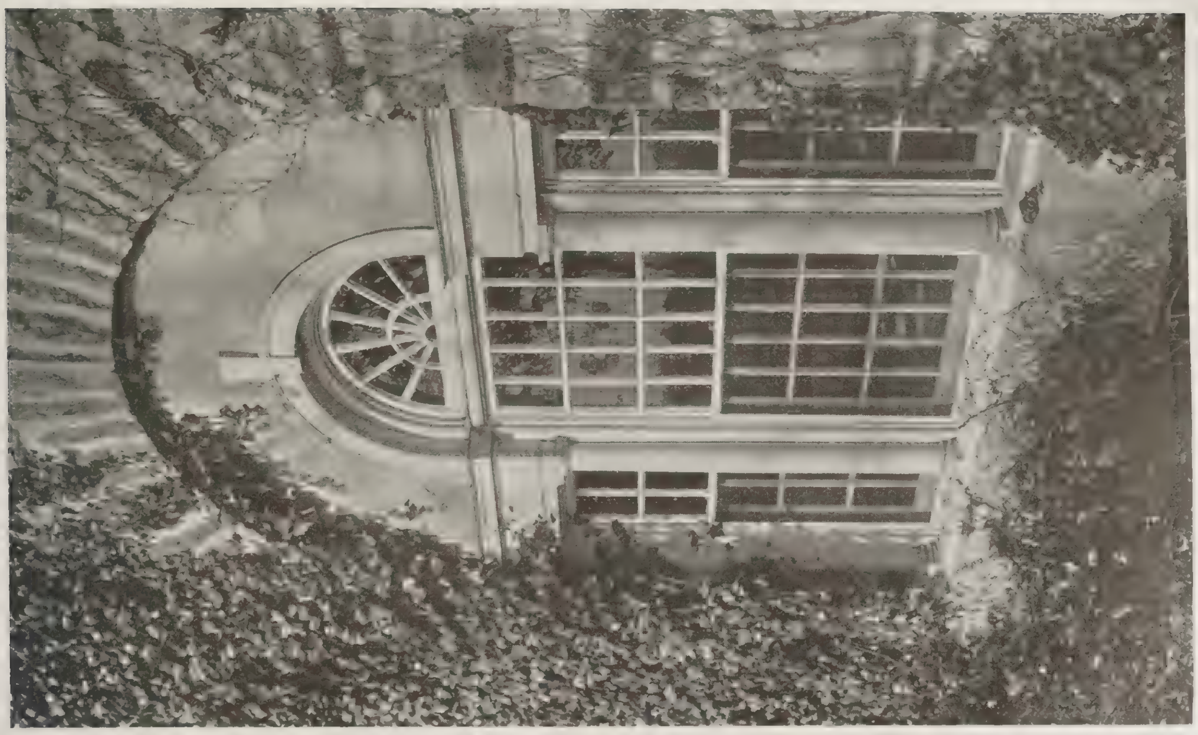
GENERAL VIEW OF STABLE AND FLOOR PLAN



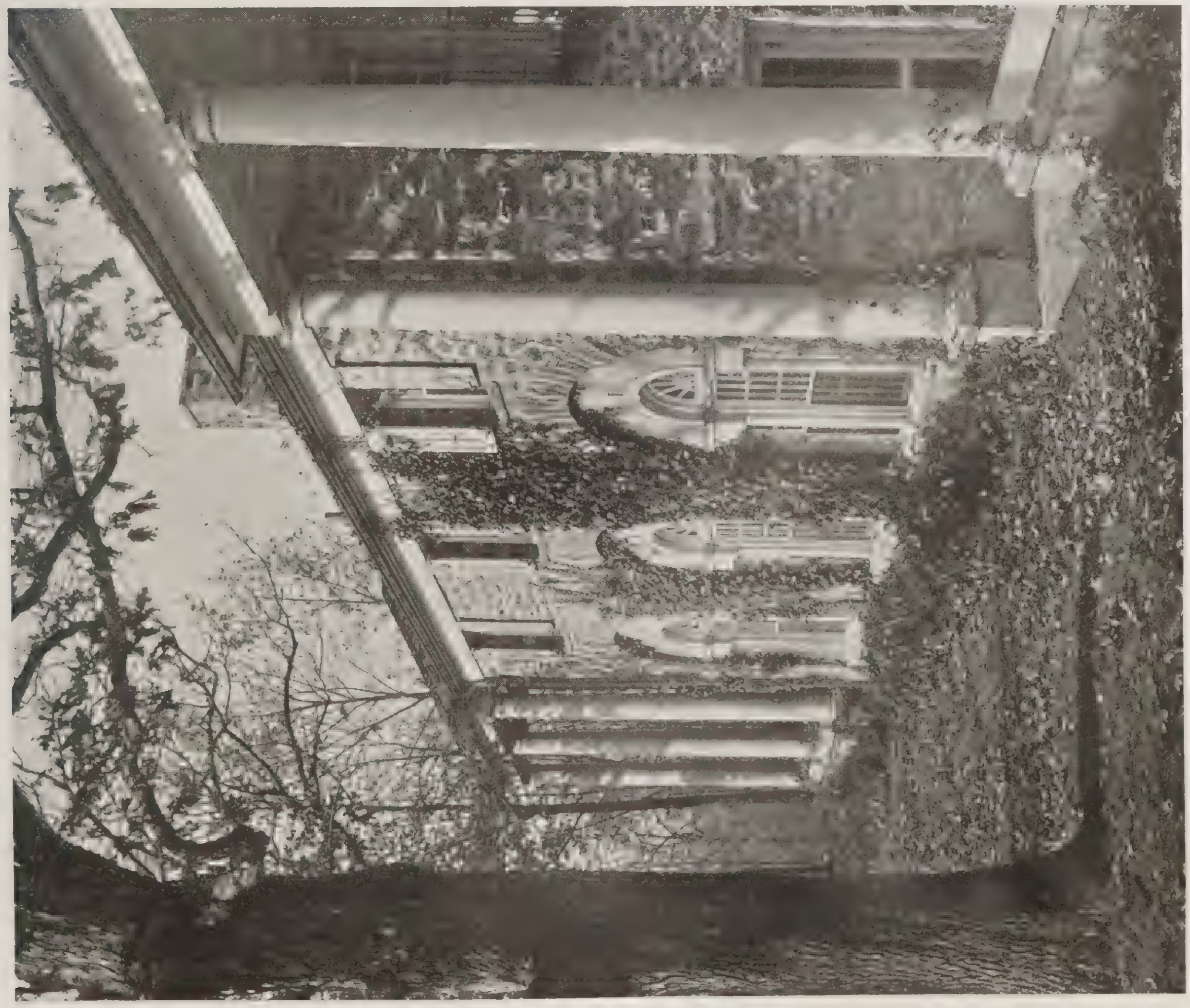
ENTRANCE FRONT OF HOUSE

"GOODESTONE," HOUSE AT MIDDLEBURG, VA.

GOODWIN, BULLARD & WOOLSEY, ARCHITECTS

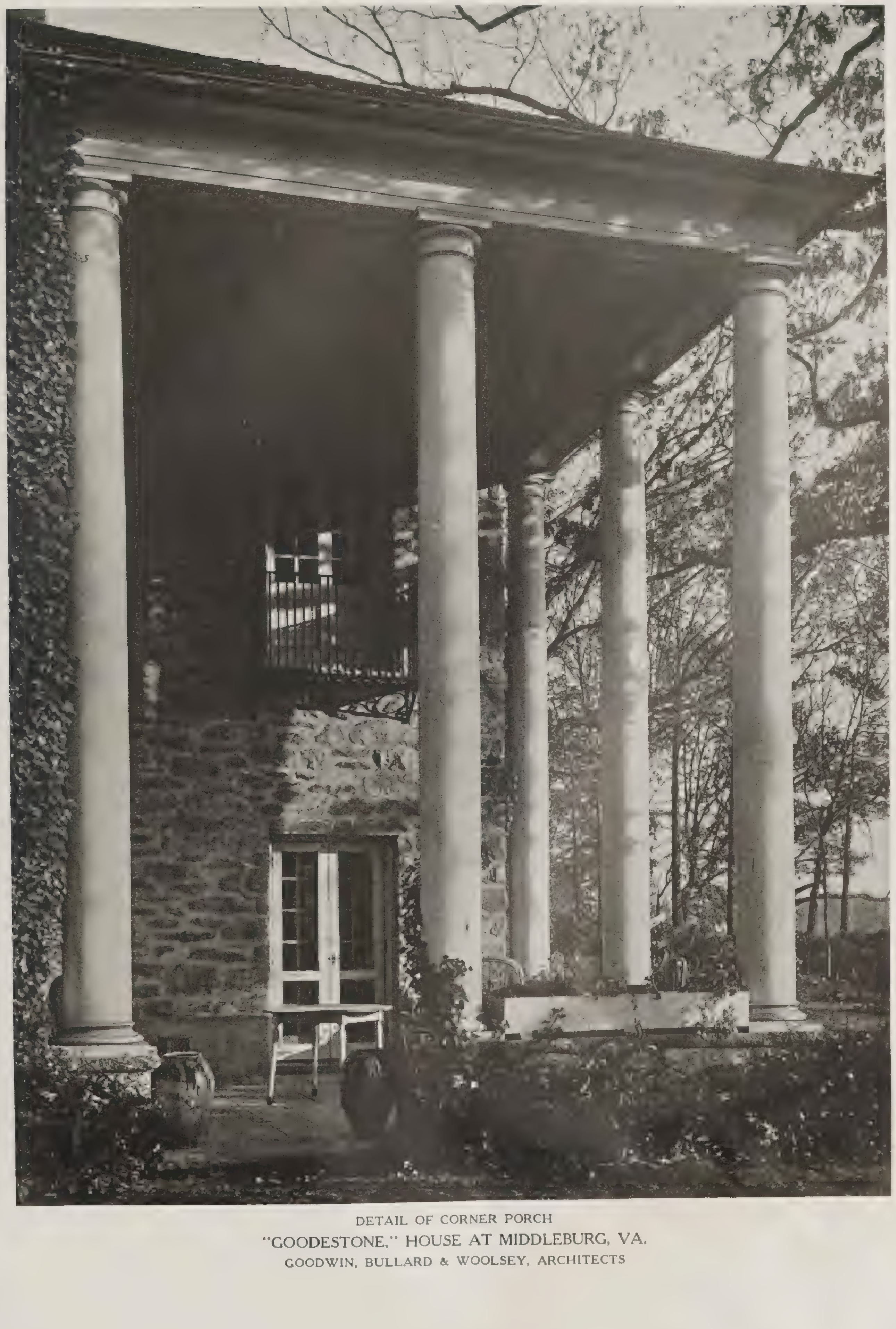


DETAIL OF LIVING ROOM WINDOW



DETAIL OF LIVING SIDE OF HOUSE

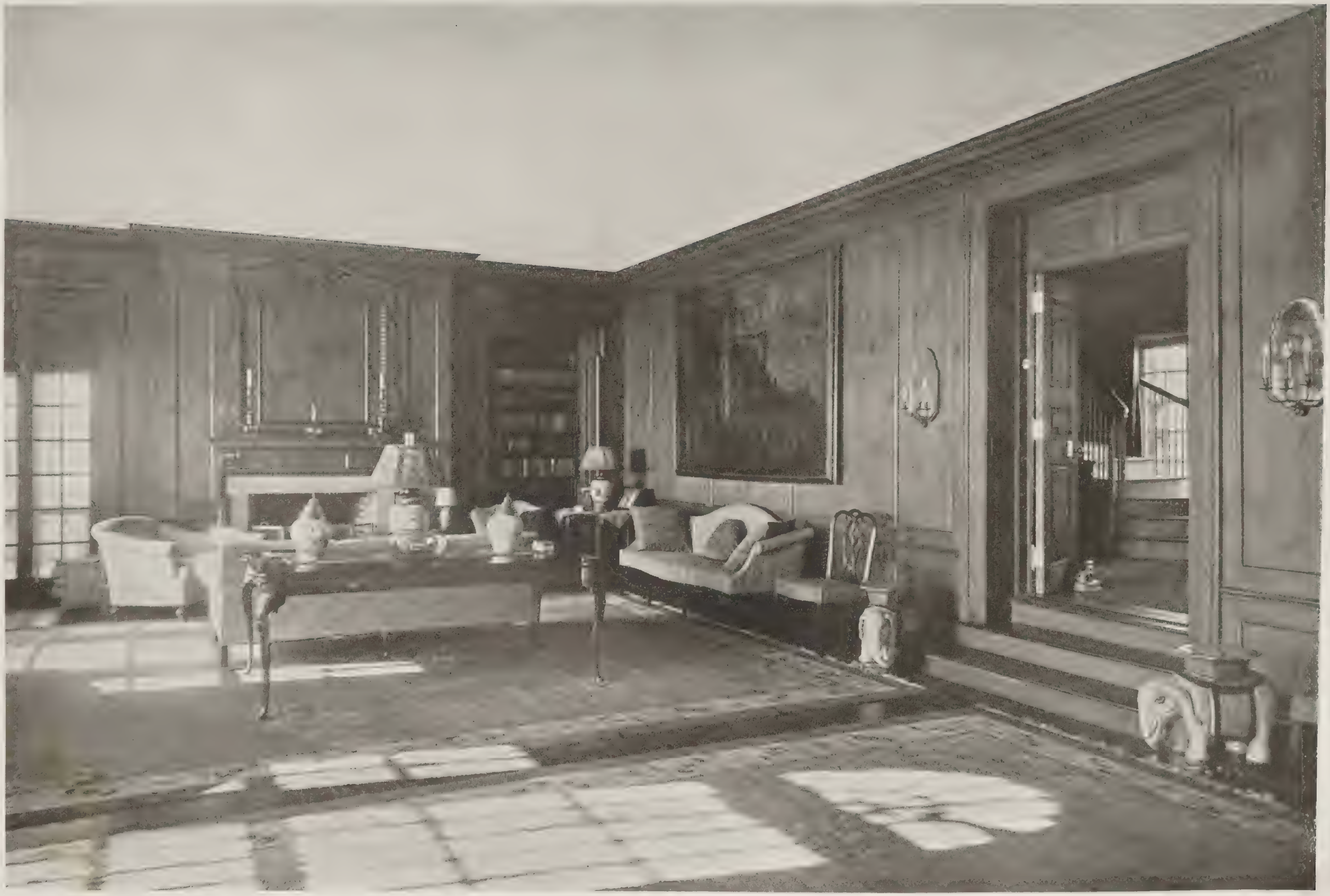
"GOODESTONE," HOUSE AT MIDDLEBURG, VA.
GOODWIN, BULLARD & WOOLSEY, ARCHITECTS



DETAIL OF CORNER PORCH

"GOODESTONE," HOUSE AT MIDDLEBURG, VA.

GOODWIN, BULLARD & WOOLSEY, ARCHITECTS



LIVING ROOM
"GOODESTONE," HOUSE AT MIDDLEBURG, VA.
GOODWIN, BULLARD & WOOLSEY, ARCHITECTS

# Picturesque New York

*By* GREVILLE RICKARD
*With Illustrations by the Author*

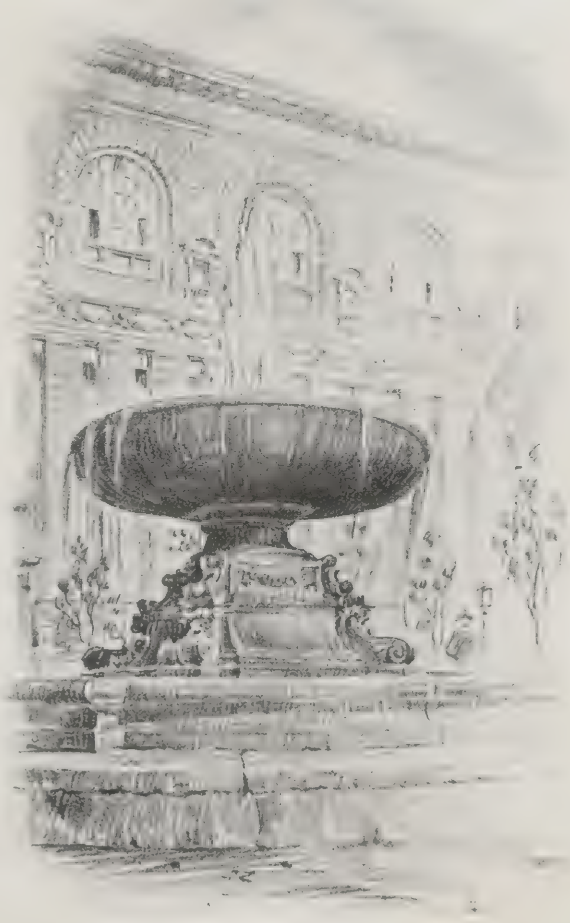
IN considering the question of what is picturesque in New York, one is likely to become somewhat bewildered in gathering together many impressions. One is apt to ask the question—"Can New York as a whole or only in part be justly termed beautiful?"

If one were to ask this question of the average New Yorker, there would be in his answer some hesitation. The inevitable comparison with other great cities of acknowledged magnificence and beauty would come to his mind,—such cities as Paris and Washington. Although the New Yorker might feel justified in boasting of his glorious "home town," it is conceivable that he would be obliged to admit that New York under ordinary conditions is not a beautiful city. It lacks the necessary qualifications of consistency and uniformity. It has been built with little thought for æsthetic results. It has not as a whole the beauty that is expected of a great city. Take Paris as an example. Paris has its open squares and parks, its beautiful vistas, its fountains and monuments, and its incomparable river Seine. All parts of Paris reflect the spirit of an artistic and aspiring people. New York, too, has its open squares and parks, its vistas and monuments, and its rivers. Its squares for the most part lack architectural symmetry. The scattered trees and wandering walks make little appeal to the artistic sense. Aimless in plan, its squares serve as a sanctuary for uninteresting fountains and monotonous monuments. Most of the monuments are meaningless in location and mediocre in merit. Its rivers are no longer beautiful. Commercial materialism has desecrated their several shorefronts. But in spite of all the ugliness in New York there still lingers a quality of the picturesque in some of the streets and squares, and the wharves from which the masts of the square-riggers have long since disappeared. From the rivers themselves may be seen the fascinating and inspiring skyline of the city. Although like a seismographic chart this skyline, this architectural contour of New York is too restless to have real beauty it does possess an inspiring and picturesque grandeur.

The accompanying sketches were made for the most part in the neighborhood of the plaza and Fifth Avenue below Central Park. The picturesque quality of this part of the city is distinctive. It possesses a dignity and spaciousness that are lacking in lower New York. From many points of view this artist has seen and felt its charm. It has sufficiently aroused his artistic sense to give him an irresistible desire to record in sketches some of these fleeting impressions.

In one sketch he has shown the splendid Gothic entrance of St. Thomas' Church, a great piece of architecture, capable of producing sensations of real emotion. Not only is it beautiful in its finely detailed carving and in its stone of varied coloring, but it is especially beautiful in the proportion of its masses. The severity of its plain walls pleasantly offsets the exquisite lacework of its carving. The fine rose window above the entrance rivals in its tracery the most beautiful examples in the old world. In another sketch, farther up the avenue, he has brought out the strong outline of the dark brown Fifth Avenue Presbyterian Church, set off in sharp silhouette against the light colored mass of the Heckscher Building.

The plaza has a quality of picturesqueness all its own, of which he has given one impression. In the foreground the soft gray stone of the Pulitzer fountain, with its terraced basins surmounted by the bronze figure of Abundance with her panier of fruits, stands out in bold relief against the warm red mass of Mrs. Vanderbilt's brick chateau. Behind and above tower the buff colored walls of the picturesque Heckscher Building. There are interesting views of the Plaza to be had from any of the adjacent side streets. As seen in another of the



The Beauty of Rome is Recalled in the Massive Fountain on the Western Terrace of the Public Library

The Towering Architecture of the Plaza Is Relieved by the Charming Contour of the Pulitzer Fountain

accompanying sketches, the whiteness of the great hotel stands out in interesting contrast to the darker buildings at the south.

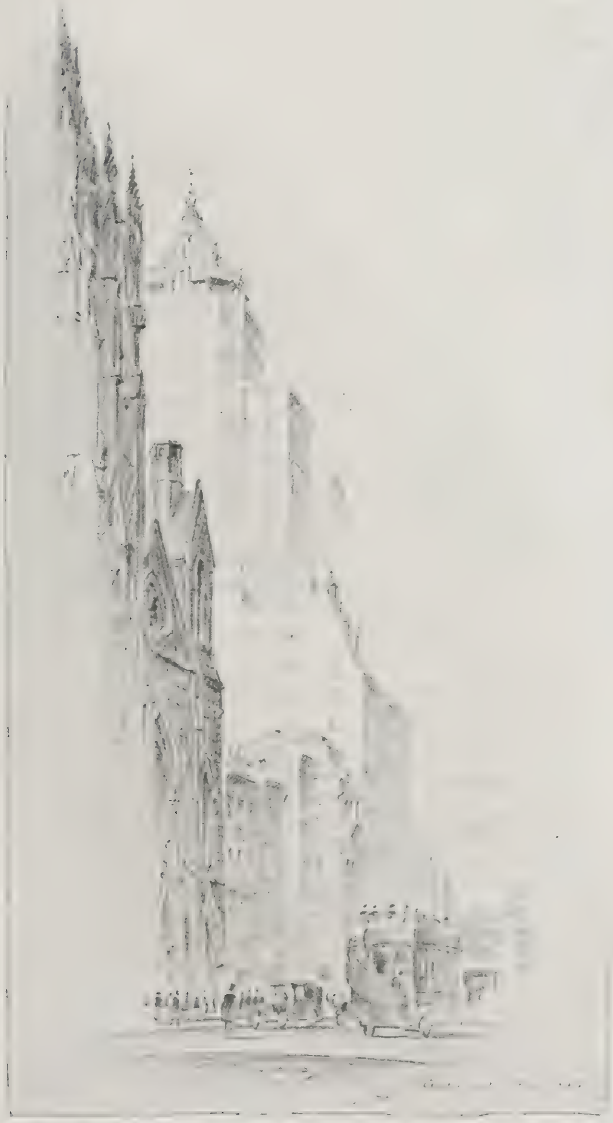
The terrace fountain designed by Charles A. Platt, which overlooks Bryant Park, just west of the Public Library has been taken as the subject for another sketch. There is a certain peaceful quiet about this oasis in the noisy, rushing, confusing turmoil of New York's center. A little of the feeling of seclusion, "far from the madding crowd," has been caught in this sketch of the fountain silhouetted against the west facade of the library. The towering pavilions of the new Fraternity Club House designed by Murgatroyd & Ogden, as seen from Madison Avenue below 34th Street, have furnished the inspiration for still another drawing. This building is a recent example of the setback type of design developed by the requirements of the new zoning law. The benefits derived from this law have far surpassed the expectations or even the intentions of its framers. The benefits hoped and planned for were of a material, not of an æsthetic nature, yet the results have proved to be responsible for quite as much improvement in the architectural aspect of the city as in the material comfort of the citizens.

Is not the beauty of Paris largely attributable to the uniformity of building heights and similarity of architectural styles? New York can hardly hope for a similarity of architectural styles to be established by law. The keynote of our American civilization has always been the freedom of individual expression. Therefore it is only natural that our architecture should likewise express every conceivable variety of individual taste, good, bad and indifferent, side by side, buildings large and small, tall and low, buildings of brick or stone, of marble or terra cotta. For the first time in the history of building in New York we have at last one law, which will bring uniformity to city architecture in one respect at least. We shall eventually have a symmetry in our street facades through the uniformity of cornice heights. Already one can see in many directions buildings of the new type. The sheer and ungainly rise of flat walls from base course to cornice line has been replaced by a logical piling up of well proportioned masses of walls and windows which break the

The Buildings on 58th Street Stand Out in Sharp Silhouette Against the White Walls of the Great Hotel skyline with a pleasing silhouette of sloping roofs or towers, doing much to create harmony.

There are other buildings, erected before the "set-back" law went into effect, which are topped with gracefully pitched roofs presenting a balanced and completed silhouette against the sky. One of the most pleasing is the Bush Terminal Building on West 42nd Street, designed by Helmle & Corbett. Some think that it has no equal in the city for pure beauty and grace of outline as it rises tower-like into the sky. See it from the west when the sunset fades into twilight, and the detail is lost in shadow; then one is impressed by the dreamlike quality it possesses. It seems like a picture-castle from the Arabian Nights rather than a practical commercial building of this material world. It inspired one of William Walcott's delightful etchings.

Another interesting example of the new type of tall building is the Shelton Hotel at Lexington Avenue and 49th Street designed by Arthur Loomis Harmon. This building, like the Bush Terminal on 42nd Street, sometimes produces the feeling of dreamlike unreality, especially against an evening sky. It gives the impression of being some gigantic stage-set for "Robin Hood." One wonders if three other sides to the building actually exist. This sensation is produced by the extreme thinness of the window reveals and the flatness of the walls.



Buildings Large and Small, Tall and Low, Light and Dark Give Variety to the Dignity of Fifth Avenue

The Massed Towers and Pavilions of the Fraternity Club Rise Grandly above the Low Roofs of Madison Avenue

Although New York as a whole may be lacking in beauty, one must grant that it possesses beautiful examples of modern architecture as well as picturesque vistas and views of real artistic value. A beautiful building or an enchanting view awakens one for the moment from materialism and helps one to forget the turmoil and struggle of city life. Only gradually does one realize the enchantment of the city's varying moods and expressions, revealed according to the changing hours and weather.

In the early hours of the day New York looms up in the veil of morning mist. Later, in the transparent atmosphere of perhaps a mid-day in June, when bright colored flags and banners give an added brilliance to the streets. And again when the rays of the setting sun bathe the tops of the buildings in an orange glow, and leave their bulk obscured by the shadows of approaching night, or when in the waning day the mantle of twilight softens with shadows the sharp silhouettes, and melts into purpled gray the details of the great massed buildings. Finally comes the yellow light of the street lamps to crowd out the twilight and flood the pavements with molten gold. At such times New York is truly beautiful, truly full of mystery and magic, poetry and romance. To the eye that can see, this city has, in parts at least, a quality of picturesqueness hardly surpassed in any other city in the world. A picturesqueness of infinite variety.

Starting from the Battery and journeying northward to Central Park, one is continually impressed by the recurring picturesqueness of New York,—the Battery with its open park, its quaint old Castle Garden, its vista up the canyon of lower Broadway, its municipal ferry building and the low brick arcade of the harbor master, facing across the narrow meeting of the rivers toward old Fort William and the barracks on Governor's Island, its wide walk along the riverfront, where the broad waters of the upper bay lead the eye off to the Statue of Liberty, the low towers and roofs of Ellis Island and the blue hills of distant Staten Island. The very mention of each one of these corners of the Battery brings to the mind a scene of delightful picturesqueness.

The Splendid Gothic Facade of St. Thomas' Produces Religious Emotions

Bowling Green, the ancient churchyards of Trinity and St. Paul's, and the open park at City Hall, give an old world touch to lower Broadway. Union Square, where the Washington statue stands out in solitary relief against the old buildings of lower Fourth Avenue, and Washington Square, where the marble arch and red brick houses preserve the spirit of Revolutionary days, all impress one with their artistic charm. The same is true of St. Mark's Church at the head of the famous old Bowery, if one will stop for a moment in the quiet seclusion of its portico, and of St. George's at Stuyvesant Square, if one will sit for a while in the cool shadow of its twin towers; Gramercy Park, with its high iron railings, its gravel paths and its axial memorial to Edwin Booth, still retaining the seclusive dignity of a small square in London; and a few blocks north where Madison Square, breaking the monotony of Broadway's older shops and lofts, gives a number of picturesque compositions, such as Paul Cornoyer and Childe Hassam loved to paint; the obelisk guarding the grave of General Worth, sentinel at the entrance to upper Fifth Avenue; the graceful tower and shadowy arcades of the Garden, seen through the few remaining trees of the old square. The Roman portico and low dome of Stanford White's Madison Square Church are missed from where they used to stand under the shadow of the lofty white clock tower. On Madison Avenue at 36th Street the perfect proportions and refinement of detail which Mc Kim perpetuated for all time in that architectural jewel, the Morgan Library, suggest the Renaissance of Italy. At 42nd Street, Carrere & Hastings recall in the Public Library the architecture of the French school of fine arts.

Fifth Avenue although not beautiful is impressive. Here every conceivable style of architecture has been employed in the unrelated facades of the motley array of buildings. St. Patrick's Cathedral is imposing. The Gorham and the Tiffany Buildings and the University Club are fine examples of the "grand style" of McKim, Mead & White. St. Thomas' Church by Cram, Goodhue & Ferguson, the stone chateau of the Vanderbilts at 52nd Street, the older house by Richard M. Hunt and the newer house by Stanford White, all lend added dignity and distinction. A pilgrimage filled with changing colors and varied impressions. History and romance have shadowed one's footsteps; the history of the material growth of a great city, the romance of the artistic development of a new people expressed in the city itself.

# ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

## The Use of Hydrated Lime With Portland Cement

*By* JOHN W. RAMSEY

ALTHOUGH it is not commonly known, there are two kinds of lime; one is high calcium, and the other magnesia or dolomite. When you buy hydrated lime, you buy, of course, some water, and all you get that is of value is available oxide, and it is necessary for the user to look at the bag and see whether he is buying 28 per cent of water or 18, or 70 or 80 per cent oxides.

Another point to remember is the fact that analysis is not the whole story. Lime is shipped from Maine to Illinois, passing en route several lime plants making the same kind of lime, as shown by analysis. Also, lime has been shipped for years from Pennsylvania to northern Maine. The buyers of these limes are not foolish, but for their particular purposes, the lime they buy gives them the results they desire and which other limes will not.

An instance about twenty years ago within the knowledge of the writer was the purchase by a manufacturing concern of hydrated lime which happened to contain 18 per cent water and 32 magnesia. The chemist for the mill condemned the material and declared 50 per cent of the hydrate was worthless and cost more money than lump lime, pound for pound, and that twice as much hydrate as lump lime would have to be used to get the same results. The chemist was asked to prove his theory by actual test, and he was surprised to find that he had made an error when the hydrate proved to do pound for pound what the lump lime would do, and the hydrate had the added advantages of being cleaner, subject to no slacking, and causing no increase in insurance rates in the buildings where it was stored.

About 1907 one prominent New England railroad tested out hydrated lime with these results:

| Mixture | Tensile 7 days | Strength 28 days | Quantity of water passing through 10 min. 7 days 10-lb. press. | 7 days 20-lb. press. | 7 days 30-lb. press. | 28 days 10-lb. press. | 28 days 20-lb. press. | 28 days 30-lb. press. |
|---|---|---|---|---|---|---|---|---|
| Sand ............. 900 pts.<br>Cement ........... 300 " | 200 | 250 | 30cc. | 45cc. | 65cc. | 25cc. | 30cc. | 28cc. |
| Sand ............. 900 "<br>Hydrated lime .... 15 "<br>Cement ........... 285 " | 175 | 255 | 50cc. | 70cc. | 80cc. | 18cc. | 30cc. | 32cc. |
| Sand ............. 900 "<br>Hydrated lime .... 60 "<br>Cement ........... 240 " | 120 | 200 | 15cc. | 40cc. | 50cc. | 5cc. | 10cc. | 10cc. |
| Sand ............. 900 "<br>Hydrated lime .... 90 "<br>Cement ........... 210 " | 110 | 160 | 5cc. | 7cc. | 10cc. | 0cc. | 1cc. | 3cc. |

Of course, hydrate was not so well known in 1907 as it is now, but these tests check up closely with the results of tests issued recently, as shown here and given in Bulletin 303 of the National Lime Association, which is easily to be had upon request from any of its offices.

Series No. 5. 1:3 Portland cement and sand, working consistency.

Series No. 6. Same with 2.5% of hydrated lime added.

Series No. 7. Same with 5.0% of hydrated lime added.

Series No. 8. Same with 7.5% of hydrated lime added.

Series No. 9. Same with 10.0% of hydrated lime added.

Storage Methods:

(a) Under water in tank in laboratory.

(b) In open air in laboratory.

(c) Outdoors, exposed to all weather, March 1 to April 15, 1916.

(d) In laboratory, alternating one week in water and one in air.

(e) Buried in moist, clayey soil.

| Series | Storage | Tensile strength in lbs. per sq. in. 7 days | 14 days | 21 days | 28 days |
|---|---|---|---|---|---|
| 5 | a | 156 | 199 | 240 | 270 |
|  | b | 142 | 171 | 189 | 150 |
|  | c | 103 | 98 | 156 | 141 |
|  | d | 154 | 259 | 223 | 326 |
|  | e | 122 | 166 | 208 | 223 |
| 6 | a | 172 | 201 | 235 | 274 |
|  | b | 115 | 98 | 146 | 130 |
|  | c | 86 | 95 | 139 | 148 |
|  | d | 157 | 247 | 208 | 335 |
|  | e | 118 | 189 | 220 | 239 |
|  | a | 191 | 228 | 275 | 299 |
|  | b | 148 | 132 | 156 | 154 |

| | | Tensile strength in lbs. per sq. in. | | | |
|---|---|---|---|---|---|
| Series | Storage | 7 days | 14 days | 21 days | 28 days |
| 7 | c | 110 | 162 | 145 | 169 |
| | d | 203 | 312 | 249 | 386 |
| | e | 156 | 230 | 274 | 300 |
| | a | 169 | 218 | 250 | 274 |
| | b | 139 | 166 | 159 | 166 |
| 8 | c | 107 | 158 | 158 | 189 |
| | d | 162 | 321 | 233 | 310 |
| | e | 138 | 213 | 239 | 285 |
| | a | 201 | 249 | 271 | 299 |
| | b | 154 | 169 | 181 | 208 |
| 9 | c | 141 | 148 | 188 | 271 |
| | d | 189 | 314 | 273 | 408 |
| | e | 168 | 228 | 279 | 305 |

Watertightness: These tests were made by Sanford E. Thompson, Boston.

Concrete of 1:2:4 mixture, hydrated lime added; specimens were 4 inches thick, water pressure was 80 pounds per square inch.

| Percentage of hydrated lime | Flow in grams per minute | | |
|---|---|---|---|
| | At 14 days | At 21 days | At 28 days |
| 0.0 | 5.52 | 2.92 | 1.91 |
| 2.0 | 9.20 | 2.55 | 1.63 |
| 4.0 | 2.82 | 1.49 | .76 |

In another series of tests by Mr. Thompson, the specimens were concrete cubes in which iron pipes were imbedded, through which the water pressure could be applied. The results were thus given:

| | | Flow under 7-ft. head | | Flow under pressure of 60 pounds per sq. in. | | | |
|---|---|---|---|---|---|---|---|
| Per cent hydrated lime | Age in days | Duration of measured flow in hours | Flow in grams per hour | Age in days | Press. apl'd before measure in hrs. | Duration of measured flow in hours | Flow in grams per hour |
| 1:2:4 Concrete | | | | | | | |
| 1 | 18 | 161 | 2.7 | 40 | 24 | 4¼ | 74.8 |
| 4 | 18 | 161 | 1.2 | 41 | 18 | 5 | 28.4 |
| 7 | 18 | 161 | 1.0 | 42 | 18 | 6¾ | 5.2 |
| 10 | 15 | 161 | 1.0 | 46 | 6 | 18 | 1.6 |
| 1:2.5:4.5 Concrete | | | | | | | |
| 0 | 30 | 169 | 1.9 | 45 | 18 | 6 | 32.5 |
| 10 | 29 | 169 | 0.8 | 49 | .. | 11 | 0.0 |
| 14 | 29 | 169 | 0.7 | 50 | .. | 27 | 0.0 |
| 1:3:5 Concrete | | | | | | | |
| 0 | 26 | 169 | 9.8 | 50 | 6 | 14 | 70.6 |
| 8 | 26 | 169 | 1.1 | 51 | 8 | 17 | 3.6 |
| 14 | 28 | 169 | 1.1 | 50 | 28 | 13 | 10.7 |
| 20 | 28 | 169 | 1.2 | 53 | 9 | 15 | 0.7 |

In connection with these tests Mr. Thompson in an address delivered before the American Society for Testing Materials said: "The cost of large waterproof concrete structures frequently may be reduced by employing leaner proportions of concrete with hydrated lime admixtures, and small structures, such as tanks, may be made more watertight. Although the character of the sand and stone used in the concrete will affect the best percentage of lime to use, the present materials are representative of average materials throughout the country, so that the results should be of general application. Coarser sand would naturally require slightly larger percentages of lime, and finer sand (that is sands having a larger percentage of fine grains, which pass a sieve with 40 meshes to the linear inch) would be likely to require less lime since sands containing considerable fine material produce a more nearly watertight concrete." His experience proves this, after experiments covering a number of years.

In addition to this we find some good data in this same Bulletin on the "Effect of Sea Water." A test to determine the effect of adding hydrated lime to concrete mixed with sea water was made by the Dravo Construction Company at Sparrows Point, Md. Blocks were 4 x 6 x 12 inches. The mixture was 1:2:4. The sand and gravel both were soaked by rain. The hydrated lime was added to the extent of 10 per cent of the cement content, by weight.

| Block No. | Mixed with | Stored in | Age in days | Total load in pounds | Ultimate strength lbs. per sq. in. | Per cent of lime |
|---|---|---|---|---|---|---|
| 1 | F. W. | air | 8 | 972.4 | 138 | 0 |
| 2 | F. W. | air | 9 | 864.1 | 122 | 10 |
| 3 | F. W. | water | 9 | 1405.6 | 198 | 10 |
| 4 | S. W. | air | 8 | 852.7 | 120 | 0 |
| 5 | S. W. | air | 9 | 892.6 | 126 | 10 |
| 6 | S. W. | water | 9 | 1434.1 | 202 | 10 |

The specimens were all tested and broken as beams with the 4-inch dimension vertical, and maximum possible span.

### Expansion and Contraction Due to Weather and Moisture

An exhaustive series of tests to determine the effect produced by adding hydrated lime to mortars and concrete in connection with the changes in volume caused by varying weather and moisture conditions was made by the Henry M. Spackman Engineering Company, these tests having proved to be of great interest and value.

The mortar specimens were 3 feet, 3 inches long and 4 inches square. The basic mixtures were 1:3 and 1:4 to which were added various percentages of hydrated lime and in some of which hydrated lime was substituted for Portland cement in various percentages. The concrete specimens were 6 feet, 6 inches long, 18 inches wide and 6 inches thick. The concrete specimens were placed in the ground out of doors with their tops flush with the surface. The mortar specimens were stored in various ways, in the laboratory under water and in the air; out of doors, and alternately in air and water. Measurements were taken with a specially designed steel micrometer reading to 1/100 mm. but not provided with temperature compensation. The readings were taken on copper plugs inserted in each end of each specimen. The initial reading was taken four hours after casting the specimen and was recorded as being the absolute length of the specimen. Readings were then taken at 24 and 48 hours, after which they were taken every week for a period of six months. To present figures giving the results of these tests would require more space than can here be devoted to them, in order to be of value. This quotation, however, is made from the summary of the report made by the Spackman Company. "The investigation as a whole, in our opinion, indicates that the addition of hydrated lime will be found advantageous under ordinary climatic conditions, not only in concrete road construction but in concrete work generally, where it is exposed either to air or to fresh water, as concrete to which such additions have been made, besides being more impermeable will show less change in volume under varying moisture content."

### Concrete in Salt Water

Investigation has proved that the prime requisite for the integrity and permanency of concrete in sea water is density. The use of hydrated lime has been very generally adopted in Europe for concrete marine structures, both floating and fixed. Hydrated lime has also been used with great success in several floating concrete structures in this country. One of the most interesting uses of hydrated lime in this country was in the construction of concrete oil barges by the Torcrete Shipbuilding Co. of New York. These barges carry oil in bulk, and so are exposed to the action of crude oil on the concrete inside, and the action of sea water on the outside.

Another interesting example is to be found in the plant of the Union Salt Works at Cleveland. This company uses concrete tanks 100 feet long, 8 feet wide, 2 feet deep and 4 inches thick to evaporate the brine, as pumped from the earth, by boiling the brine within the tanks. The product obtained by boiling is removed from the tanks in the form of salt sludge, which is placed in concrete tanks or drain bins, also containing hydrated lime, to be drained and dried. The concrete tanks and bins have given perfect satisfaction for over two years, after having been subjected to natural salt action which is much more severe than that encountered in natural sea water.

Dr. Wm. Michaelis has made perhaps the most intensive study of the action of sea water on concrete, and in reporting on his experiments used these words: "Under ordinary temperatures carbonate of lime cannot be decomposed by sulphates; hence the most extensive formation possible of calcium carbonate from an excess of hydrated lime will be the best possible protection."

### Hydrated Lime for Waterproofing

In Bulletin 302 of the National Lime Association there is given some interesting information:

"There are certain technical and economic criteria which determine the degree of usefulness of every structural material, and the study of a large number of concrete structures, both in course of erection and during years of service, has shown that a waterproofing material, to satisfy both technical and economic requirements, should possess these properties:

1. It should in no way injure the concrete, either chemically or physically.
2. It should be preferably of a character chemically similar to that of cement.
3. It should enter the mixture in its most effective form and not rely for its waterproofing quality on chemical reactions that have to take place after it is in contact with the ingredients of the concrete.
4. It should be permanent and not subject to decomposition or decay, and therefore it should be a mineral rather than an organic compound.
5. The material should be finely divided, bulky, and preferably of a colloidal nature, so as to lubricate the mass during handling and placing and act as a void filler in the hardened concrete.
6. It should readily mix with water and adhere to the other ingredients of the concrete.
7. It should be convenient to handle and easy to proportion and incorporate in the mix.
8. It should be inexpensive, so as not to increase the cost of concrete materially.
9. It should be a staple material, produced in all parts of the country, rather than a specialty.
10. It should be obtainable wherever Portland cement is sold and used."

A few years ago the U. S. Bureau of Standards made an extensive investigation into the effectiveness of various waterproofing materials. Over 40 materials were used, including hydrated lime. The result of the investigation is reported in Technologic Paper No. 3 of the United States Bureau of Standards, and we quote a statement taken from the summary of the report. This conclusion refers to the use of hydrated lime:

"This is the most efficient medium employed, and resulted in an almost impermeable mortar at the two weeks' test. Its value is probably due to its void-filling properties, and the same results could be expected from any other finely ground, inert material, such as sand, clay, etc."

While from the standpoint of producing a watertight concrete the various substances mentioned other than hydrated lime might prove equally effective, their use as a substitute for hydrated lime proves prohibitive from the standpoint of economy when an effort is made to produce sand or clay in as finely divided particles as hydrated lime.

Our recommendations for a 1:5 mix are 8 pounds of hydrated lime per bag of cement; 1:6 mix, 10 pounds hydrated lime; 1:7 mix, 12½ pounds hydrated lime. Hydrated lime can be accurately and conveniently measured. A 6-quart pail, heaping full, holds 8 pounds; an 8-quart pail holds 10 pounds; a 10-quart pail holds 12½ pounds.

There is no question that hydrated lime improves the workability of concrete (wet or dry mix) so that it is placed more easily and more economically in the forms. It reduces the quantity of water ordinarily used to give the same consistency, and in this way greater strength is obtained with less danger of shrinkage cracks; it helps to eliminate stone pockets and voids, makes concrete more nearly watertight, and produces better finishing surfaces.

To sum up, it might be said that hydrated lime:

1. Is an excellent medium for water-tightening concrete.
2. Makes concrete more workable.
3. Reduces placing and finishing costs.
4. Secures less danger of shrinkage cracks.

5. Will increase strength of concrete if proper amount be used.
6. Helps to eliminate voids.
7. Must make a denser mix, and also on account of its nature the mix is more plastic, as hydrated lime is much finer than other ingredients of concrete (this includes water).
8. A 10 per cent addition will show about 130 per cent more adhesion in brick mortar.
9. When Portland cement is setting hydrated lime is formed, so by adding hydrated lime to cement one is only increasing the proportion in the final product. Some day the cement manufacturers will do this, that is, when it is demanded of them.
10. These mixtures are recommended in Bulletin 306 of the National Lime Association, and they cover most requirements:

"The admixture of hydrated lime to concrete shall be allowed for all classes of concrete construction when these conditions are adhered to.

"The maximum amount of hydrated lime which may be used shall conform with this table, all weights given being the amount of lime which may be added for each standard bag of Portland cement:

In a 1:1½:3 mix, 8 pounds of hydrated lime per bag of cement.
In a 1:2:4 mix, 10 pounds of hydrated lime per bag of cement.
In a 1:2½:5 mix, 12 pounds of hydrated lime per bag of cement.
In a 1:3:6 mix, 16 pounds of hydrated lime per bag of cement."

"The quantities of Portland cement, sand, and coarse aggregate shall not be altered in any way; the hydrated lime shall be used as an additional ingredient. For hand-mixed concrete, the hydrated lime and Portland cement shall be well mixed dry."

Kitchen Garden, Mount Vernon

# Handbooks; Their Use and Abuse

*By* E. N. PIKE

A WISE man many years ago wrote: "Of making many books there is no end, and much study is a weariness of the flesh". Doubtless the book from which this is taken will be recognized. The first statement seems to refer to our subject, for apparently there is no end to the making of handbooks on every subject pertaining to the profession of architect or engineer. Perhaps the study of them may be wearisome, but their use saves brain fatigue and time. The older members of these professions well remember the days when such helps were unknown, and the younger men little realize the debt we owe to the painstaking men of other days who gathered from their notebooks much of the general information that makes some of the older "pocketbooks" so useful. It is the purpose of this article to deal especially with the handbooks in general use in structural design, and to suggest to those who must use them without technical training some of the more common errors in their use.

Many of these books have come to be recognized as authorities and are frequently referred to in specifications. When this is done, the particular edition intended should be mentioned, as details and specifications are subject to change in later editions. The handbooks published by several rolling mills and long in general use may usually be relied upon for the data pertaining to structural steel, yet in a notable instance the data regarding plate girders in a well known handbook fails to take account of the effect of rivet holes in tension flanges as required by good practice.

It is not too much to say that handbooks should not be used by anyone unable to compute for himself the data they contain. For though the data given may be used with safety, it may not be based upon the requirements of the building code. Then, again, there are certain limitations of tabular values on account of conditions of loading or unsupported length of top flange of beam or effect of eccentric leading on columns, to be considered, that make essential a knowledge of the mechanical principles involved. It is true that information regarding all of this is usually to be found in explanatory notes, but it is sometimes so widely separated from the tables with which it should be used as to escape the attention of anyone who did not know of its existence or the necessity for its use.

There is also a considerable amount of information that one acquires, usually by practice, and then finds that there is some rule that covers the case. For example, one may learn by experience that an 8-inch beam may be used up to 16 feet span, or a 10-inch beam to 20 feet, and so on; but one may not have discovered that it is a rule of general application that the span should not exceed, in feet, twice the depth of the beam in inches; and, furthermore, that within this length the deflection will be within proper limits. In this connection there is a popular misconception that a steel beam may be used for an almost unlimited span if its safe load is not exceeded, although the tables almost invariably give the limits that should be used. If convenience requires the use of a beam shallower than this, it is necessary to reduce the load below the safe tabular load, so that the deflection will not be excessive. The deflection may be found by the formula usually given with other useful formulæ in connection with the tabulated "elements" or "properties" of rolled shapes.

These formulæ are the fundamental principles upon which nearly all the designers' computations depend, and should be thoroughly mastered by anyone who is to make more than a casual use of a handbook. With the exception of the formula for deflection, which the layman had better take on faith, it will not be difficult for one with a good knowledge of elementary mathematics to understand and to make use of the principal formulæ. The ability to do this makes it possible to determine the strength of various combinations of rolled shapes for which data may not be found in any tables at hand.

It frequently happens that one who is dependent upon tables alone selects, for example, a plate girder section that seems almost ludicrous to the experienced designer, merely because it gives the bending moment required, while shear and rivet pitch are not considered. Another common mistake is the selection of unusual sizes of beams, channels or angles,—that is of sizes not likely to be readily procured from local stock. Warehouses are usually stocked with the lighter weights of beams and channels and a few of the intermediate sizes.

It is not uncommon in this connection to find that the section called for is one or two sizes heavier than is required. Of course where corrosion may be anticipated it is desirable to do this, but more often it is done "just for luck", and someone pays the penalty of inexperience.

One may find the data for designing roof trusses requiring little if any mental labor. The resulting design often raises the question of how the stresses given can be so accurate and the sections used so wide of the mark. And in such cases something seems to impel the "designer" to make a detail, lest the steel fabricator should not know how, with a result that would be laughable if the possibilities were not so serious. A recent illustration in *Engineering News-Record* shows the possibility of failure of a roof truss that may have been all right for sizes of material, if properly detailed, but which failed, apparently, from the exaggeration of a fault that is not uncommon in a truss for a pitch roof, at bearing on wall. Small details are often important.

Perhaps enough has been said to indicate the risks that are taken by inexperience, not to say ignorance. It is often said that one who will be his own lawyer has a fool for a client, and the same thing is more or less true of engineering problems. For those of us who must make more or less occasional use of handbooks and are qualified to do so intelligently, some suggestions may not be amiss. There is a remarkable amount of information, and in general very reliable information, to be found in several well known handbooks, but it should be kept in mind that these books were compiled in the interest of some particular material or type of construction, and that such data as may be given for other materials may not be entirely without suspicion of bias. For example, the tables for strength of wooden beams to be found in most steel handbooks are usually from 20 to 40 per cent under allowable values. In the case of data for various types of concrete construction, one does well to satisfy oneself that the methods of computation used are such as one can approve, or will comply with building laws.

There is so much tabulated data available that no single handbook is likely to contain all the data one can use. Of the handbooks published by rolling mills at least two are necessary to include both "Standard" and "Bethlehem" sections. There are also several books on structural design and concrete construction by well known authors, containing many useful and labor-saving tables, which should have a place in the engineer's working library. One should, therefore, be familiar with the material to be found in these books, and make use of that best suited to the problem.

In the design of steel beams, for example, there are tables of safe uniform loads for varying spans; safe loads per foot of length for varying spans; spacing of beams for given load per square foot; moments of resistance for beams; coefficients of strength; and section moduli. The first may be found in all handbooks and is perhaps the safest for occasional use, as it involves no computation except for total load. Present-day requirements of long span floor construction and minimum depth of beams often make it necessary to use Bethlehem H sections as beams. For this condition it is most convenient to find the section modulus required. As the tables giving section moduli can be much more compact than those for uniform loads, it will frequently be found a saving of time to make all computations on this basis. This simple operation is often made more involved than necessary by the use of length in inches instead of feet. For a distributed load and a fiber stress of 18,000 lbs., section modulus $= \frac{WL}{12{,}000}$ where L is length in feet; for 16,000 lbs., $S = \frac{WL}{10{,}666}$.

It is convenient sometimes to determine the strength of a beam when no tables are available. There are several approximate rules for this; one that is perhaps easy to remember is:—section modulus $= \frac{d\,w}{10}$; in which d is depth of beam in inches and w is weight of beam in pounds per foot. This formula applies to the light weights of Bethlehem beams with an error of not over 5 per cent. For example, taking an 18-inch, 49-lb. B I; $18 \times 49 \div 10 = 88.2$. Section modulus is 88.7.

In like manner a knowledge of the method by which moments of inertia are derived will enable one to perform almost all of the computations required in the design of structural steel without use of tables.

For those who make frequent use of certain tables it is frequently a saving of time to prepare one's own, bringing together such data as is most frequently required, and combining the values for both Standard and Bethlehem shapes. This is particularly useful where the requirements of the building code make it necessary to use unit stresses differing from those used in any of the available handbooks.

Old Houses on Canal, Bruges, Belgium
Photograph by Harold C. Whitehouse, Architect

# Plate Description

House of Mrs. R. M. Bissell, Farmington, Conn. Plates 39-42.—In designing this house there were borne in mind the fine old buildings still standing in Salem, Portsmouth and Newburyport, so many of which were erected during the latter half of the eighteenth century when these seacoast towns were at the height of their prosperity,—houses square and solid, three full stories high, with gracefully proportioned cornices, low hip roofs generally having decks surmounted by low balustrades, and chimneys in the side walls, and frequently having at one side a service wing which in many instances was the original homestead. The main front of this house and also the front which faces the terrace are of siding, while the ends or sides of the building are clapboarded. The roof is of copper which has weathered to various shades of blue-green, and about the living porch and the dinner porch there has been installed some old wrought iron from Mobile.

In the plan of the house there has been only slight departure from that of almost any of the older New England houses. The area, which in the earlier houses would have been devoted to carrying the wide hall through the house, has been considerably reduced in order to add to the length of the main living room, but the hall possesses the dignified stairway with open string and mahogany handrail and the Palladian window on the landing which would be found in any of the older houses. The windows are triple-hung and are 9 feet, 4 inches in height, easy access to the terrace being had when the two lower sashes are raised, as they often are in summer.

"Goodestone", House at Middleburg, Va. Plates 43-48.—Situated upon a large estate in the hunting country of Virginia, this house is occupied by its owners as a hunting lodge for only a small part of each year, serving for the greater part of the time as the estate's center of administration. The structure is built of a gray stone which abounds in Virginia, and that used here was quarried not far from where the house stands. Cream colored mortar has been used for laying up the walls and for slightly "buttering" the stonework. Stucco of a pale buff is used for the wall areas within the arches and about the tops of the Palladian windows of one of the facades. The roofs are of shingles, and the exterior trim, including the window blinds, the cornices and the tall columns are painted cream color.

The plan of the house is such that it involves two fronts, one facing south and commanding an extensive view toward the Blue Ridge Mountains, while at the opposite side is the front which includes the main entrance to the house. The floor plans provide for an interior which fulfills the promise made by the generous proportions of the house as seen from without. The large entrance hall, two full stories in height, contains a curving stairway, the balustrade of which is continued as a guard for the narrow gallery which extends across the hall at the second floor level. From the entrance hall several steps lead down into the living room, the walls of which are sheathed with pine which is arranged in panels and stained and slightly waxed. The trim elsewhere in the house is painted, with a stair rail of mahogany.

Cloister, Salisbury Cathedral, Salisbury, England
Photograph by Harold C. Whitehouse, Architect

# EDITORIAL COMMENT

## WORTHY TRADITIONS OF AMERICAN ARCHITECTURE

THE modern revival of American architecture, which of all the arts has made the greatest progress during the past 30 years, dates from the Columbian Exposition in Chicago. Previous to this epochal event in the artistic development of this country, there had been little advance made in recovering from the pernicious influence of the Victorian period, an era when all the arts sank to the lowest level of stagnant sterility; a time of decadence of taste, which in the United States was greatly influenced by the combined effects of growing materialism and the Civil War.

From the close of the War of 1812 the material prosperity of this country increased by leaps and bounds. The steady growth of the American merchant marine brought the United States into closer touch than ever before with England and France. As always, our architecture was largely influenced by contemporary work in those countries, and never more so than during the 50 years preceding the Civil War. French architecture had not recovered from the devastating effect of the French Revolution and the overthrow of Napoleon the First. England under the Germanic taste of Queen Victoria sank into a hopeless mire of mediocrity from which it was hard to emerge. The intricate ugliness of the Eastlake style, followed by the elaborate decoration of William Morris, had a disastrous effect upon architecture and design in this country. The remarkable mercantile and mechanical growth of our people left them little time for or interest in the study of the historic styles of architecture. Surrounded as they were with examples of English Georgian and French Renaissance architecture of the highest order, for three-quarters of a century design in this country was but little influenced by them. The Civil War, which shook our nation to its very foundation, destroyed the lavish, open-hearted culture of the South, and left the cold, conservative civilization of the North to preserve and revive American culture and traditions.

The revival, which was slightly evidenced in 1876 at the Centennial Exposition in Philadelphia, took definite shape 17 years later at the Columbian Exposition at Chicago. Here the perishable palaces of white stucco with their formal settings of lagoons, terraces and colonnades, and their profuse adornment with elaborate sculpture and decorative detail, which showed for the first time in 70 years the direct influence of Classic and Renaissance architecture upon design in this country, opened the eyes of the American people to the beauty of refined ornament and perfect proportion, and awakened their minds to a belated appreciation of studied scale and balanced design, so important to architecture.

Thus began the great revival of American architecture. Founded as it was on a fresh interpretation and a free adaptation of architectural precedents found in England and Europe, it has made Americans appreciate the value of their own early architecture. To record and preserve the buildings of the colonies and early republic has not only awakened local interest and attention, but has also assumed national importance. Every large city or small town now has its historical and antiquarian society. Such societies as the Daughters of the American Revolution, the Colonial Dames, the Society of Colonial Wars, have done a great work in purchasing and restoring, through public and private subscription, many of the finest examples of Colonial architecture. In Salem the Peabody Museum and the Essex Institute exert great influence in the appreciation and preservation of early examples of architecture and the decorative arts. The Society for the Preservation of New England Antiquities, which was established in Boston, has done an invaluable work in purchasing and restoring a number of the best examples of early American country and city houses. Nothing can have a more permanent or beneficial effect upon the future development of American architecture and decoration than the perpetuation of the best examples of Colonial design, which derived its inspiration from the work of the great English and French architects and draftsmen of the eighteenth century.

Several years ago the Metropolitan Museum of New York established a department devoted to American decorative art. From a small beginning this branch of the Museum's activities has grown to be one of the most important. Through the munificent gift of Morris K. Jessup a new wing is being added to the Museum, which has as its court facade the front of the old United States Assay Office, built on Wall Street a hundred years ago. In this so-called American Wing of the Museum will be housed the already large collection of carefully selected examples of early American decorative art. From Washington the word now comes that a department to be devoted to American architecture may be incorporated in the new building for the National Museum. It is intended through the exhibits of this department to illustrate the growth and development of design in the United States.

Our early architecture has merit and interest that entitle it to permanent recognition. Without minimizing the great value of foreign art or lessening our admiration for it, we can perpetuate our traditions by giving examples of American architecture museum recognition when it deserves it. Recent events indicate that this favorable result is about to be achieved in many different sections of the country.

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# THE ARCHITECTURAL FORUM

## APRIL 1924

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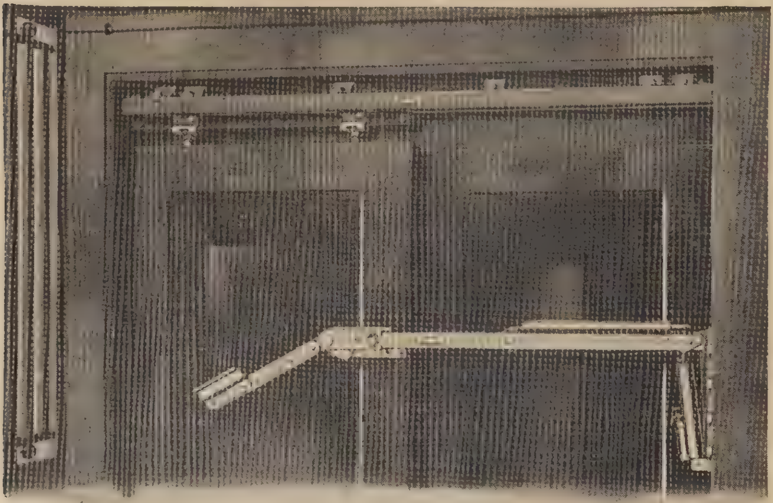

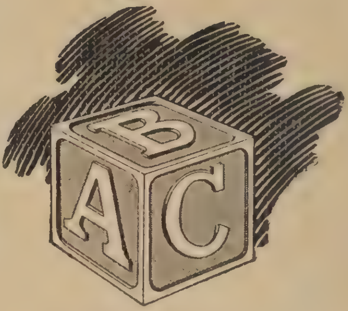

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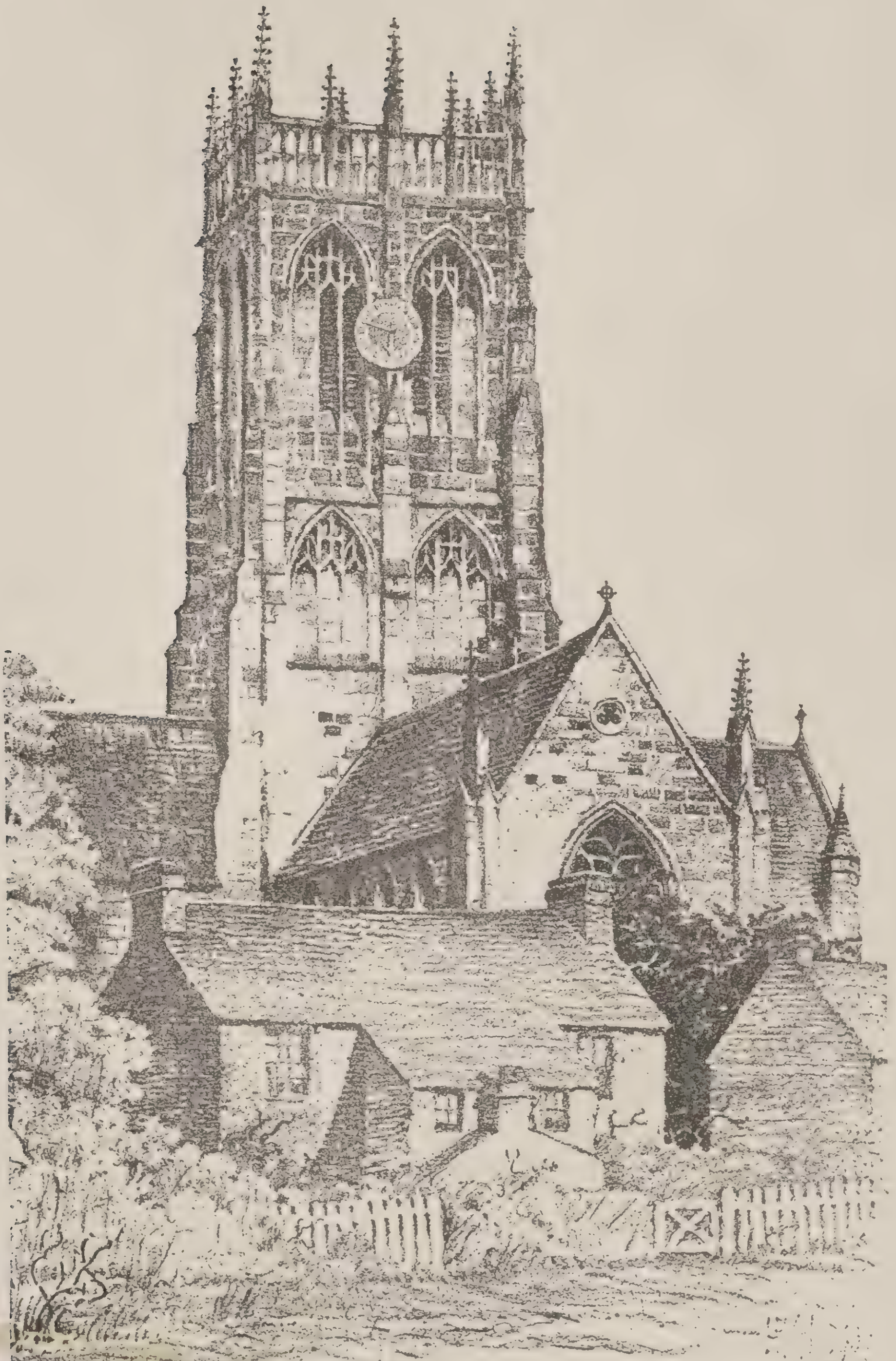


HEDON CHURCH, YORKSHIRE

FROM PENCIL SKETCH BY H. F. KELLOGG

The
ARCHITECTURAL
FORUM

VOLUME XL APRIL 1924 NUMBER 4

# Architecture of Liturgical Churches

*By* RALPH ADAMS CRAM

ALL the Christian architecture we have inherited from the past, from the time of the Emperor Constantine to that of the Medici, the Bourbons and the Stuarts, was the varied expression of Catholicism, whether of the Patriarchate of the West or those of the East. Plan, form, organism, all grew inevitably from the play of racial stocks and increasing, indelible tradition, on the liturgical system that had been developed by the Church to express the faith of which she was the custodian and to give it the most powerful and effective appeal to the peoples in her charge.

There is no authentic record of non-liturgical Christian public worship in apostolic or post-apostolic times. The moment the Edict of Toleration was promulgated (A.D. 313) the Church appeared before the world with a full liturgical system, rich, elaborate and significant, and this remained in universal use, though with local additions and sequent modifications, for thirteen hundred years. Since the sixteenth century it has been continued by all the Eastern Orthodox Churches, the Roman Catholic Church, and, in modified and curtailed forms, by the Anglican Church and the Lutherans. Non-liturgical public worship was unknown to Christendom until the time of John Calvin (d. 1564), from whom sprang the various Protestant denominations.

Contrary to common belief, the primitive worship of Christianity was not the simplest in form; instead, it was of extraordinary elaboration and magnificence. The nearest approach we have today to this earliest type of Christian worship is in the solemn, tremendous and highly elaborated services of the Greek and Russian Orthodox Churches, and the Visigothic or Mozarabic rite still celebrated in Spain, in chapels of the cathedrals of Toledo and Salamanca. The Roman Mass was an attempt (and a successful one) to devise a service that should be shorter, simpler and more popular than the primitive rites with their intricacy, their magnificence and their interminable length. The reformers of the sixteenth century did not return to the "simplicity" of earlier days, but rather to the Temple worship of the Jews, but without the solemn ritual and fine, austere symbolism and ceremonial which it possessed.

All the architecture, then, of Christianity, which casts such imperishable glory over fifteen hundred years of history, whether it be basilican, Byzantine, Lombard, Romanesque, Norman, Gothic or Renaissance, and the allied arts, as well, from painting and sculpture to stained glass and needlework, are the outgrowth, or rather the visible manifestation, of a religion which was essentially liturgical in its methods since it was inextricably bound up with beauty, and the ministry of beauty, in all its forms.

Now, for the first fifteen hundred years Christianity was essentially sacramental, and it so remains today so far as the Roman, Eastern and Anglican Churches are concerned. The seven great sacraments, together with the prophetic function of preaching, largely controlled the development of the organism of church buildings. Of these sacraments the Holy Eucharist or Mass was and is supreme in a very particular way, and its nature, the ceremonies that surround it, and its relation to the whole body of the faithful, practically determined the essential elements in a church plan. The Eucharist is both communion and sacrifice; in its first aspect it is for the constant spiritual strengthening of the people; in its second it is not only a perpetual memorial, but in a real sense an extension in time of the Sacrifice of Calvary and is potent for both the living and the dead, and as well a continuation of the sacrifices of the old law of the Hebrews under the new law of Christianity. Unique in its majesty and power, it demanded equal primacy in position and distinction. Therefore from the beginning a church was an altar, guarded and exalted but (in the West) clearly in sight before all the people, protected in every way, surrounded by all the beauty possible to man, and with accommodations for the priests and other members of the hierarchy, the choristers, acolytes and other orders of ministers. The remainder of the fabric was to shelter the worshipers, the congregations that came together for sermons, the processions and pageants, the subordinate chapels, shrines and altars, the tombs of the pious dead, and finally was for the exaltation by means of architecture and all the arts, through fabrics sometimes of vast devotions and uses, and above all a certain "democratizing" of worship whereby the altar was brought into the midst of the worshipers and every act of the priests and other ministers made fully visible. Here was a great humanizing process going on at the hands of the Catholic Church, and it resulted in such churches as those of France, Italy and Spain, where the sanctuary is open on all sides, though protected by screens, the choir was reduced to as small a size as possible, and the people crowded up around the altar from all sides. Spain carried this to the farthest limits by pushing the choir for canons and singers back into the nave in order that nothing might come between the people and the object of their devotion. The English cathedral type goes to the other extreme, with the high altar at the far end of an enormously long choir, and solid walls shutting it off from the aisles. This aloofness and forbidding character were not intentional but resulted from the fact that these cathedrals were formerly monastic churches, the enclosed choir being for the sole use of the monks, the people having the nave with their own altars. It is impossible to avoid the conviction that the continental plan is the right one and should be adopted in the case of modern cathedrals.

Choir and Sanctuary, St. Anne's Chapel, Arlington Heights, Mass.
Cram & Ferguson, Architects

size and always of supreme beauty, of the glory of God and the devotion and worship of His people.

In the earliest days after the liberation, two plans struggled for the mastery—the centralized, with the dome as its controlling feature, and the basilican with its nave and aisles. So far as Europe was concerned, the latter scheme was victorious, and when in the eleventh century the fully developed, centralized church such as San Vitale, Ravenna or the Royal Chapel at Aix was cut in two, and one-half affixed to a basilican nave and transepts, so giving the germ of the *chevet,* the standard type of plan was fixed for five hundred years, the type which has indeed lasted until our own day, and has given us, as its organism was fully worked out and its character established by various races, all the great churches of mediæval Christendom.

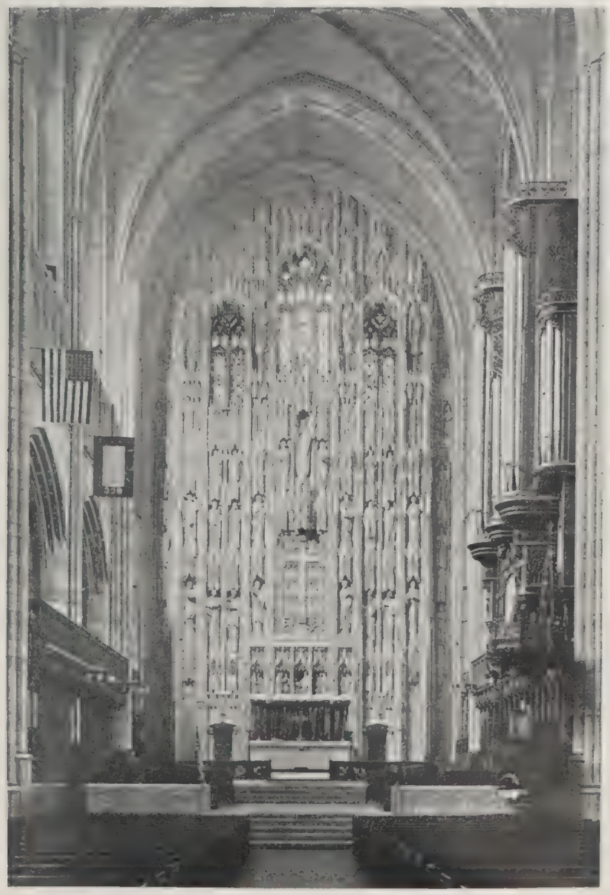
Simultaneously, two liturgical tendencies were developing: that of the East, which held tenaciously to the elaborate, primitive ritual and held the Mass in such oriental awe that the altar itself was hidden from the people by a solid screen or iconostasis and no part of the Holy Sacrifice was revealed to them; that of the West (the Catholic Church), where simplification was going on, together with constant diversity and the development of local rites,

A Christian church was then, and without contradiction for fifteen hundred years, a place where (a) Mass was said and the people came together for the public worship that centered around this supreme fact of religion; (b) a commodious house where five of the other six sacraments could be administered; (c) an auditorium where many people could be gathered together to listen to the preaching of the gospel; (d) a communal home, blended of art gallery, theater, library, school and public forum; (e) a burial place for saints and heroes and the worthy men of earth; (f) and by no means least, a sort of symbolical dwelling place for God incarnate and His saints and angels, and therefore the most beautiful thing that could be made by the hands of men.

Now the question comes, of course, as to how far the type of church that satisfied these requirements for fifteen hundred years is applicable today to those historic Churches that retain in substance the liturgical worship of the Church of the past. I think the answer is: In every particular. However much the non-liturgical bodies may have diverged from the ancient standards in point of dogma and practice, I fail to see that anything of a similar nature has occurred elsewhere, at least to the extent of compelling any radical change in the fabric of the church edifice. In the Roman, Eastern and Anglican churches the same governing influences are supreme and with the same order of precedence. Occasionally one meets with the curious belief that mediæval churches were not intended for preaching and so are not entirely practicable today when preaching is so much stressed. The facts are exactly the reverse. Sermons were more prevalent in the past than today, and they were vastly more prolonged. Frequently from ten to twenty thousand people came together to hear a famous evangelist and adjournment was necessary to the public square. Even today the standard length of a sermon in Spain is one hour. It is safe to say that in Spain today (as well as in any mediæval city), as many sermons are preached in a month as are delivered in a year in a Protestant community. The vast naves of the old cathedrals and parish churches were built as they were, with their many columns, lofty roofs, great length and wide floor areas, quite as much because so they were best fitted for the hearing of sermons as because after this fashion they were most beautiful, awe-inspiring and conducive to reverence and spiritual stimulation. A good auditorium should be long, narrow, high and much broken up by columns, arcades, arches, and vault ribs or roof beams. The square form, beloved of Protestantism, is the least successful form one could adopt and most difficult for the architect to design.

Nave and Choir, St. Vincent Ferrer's, New York

Fine example of large monastic church, though lacking permanent and adequate furnishings

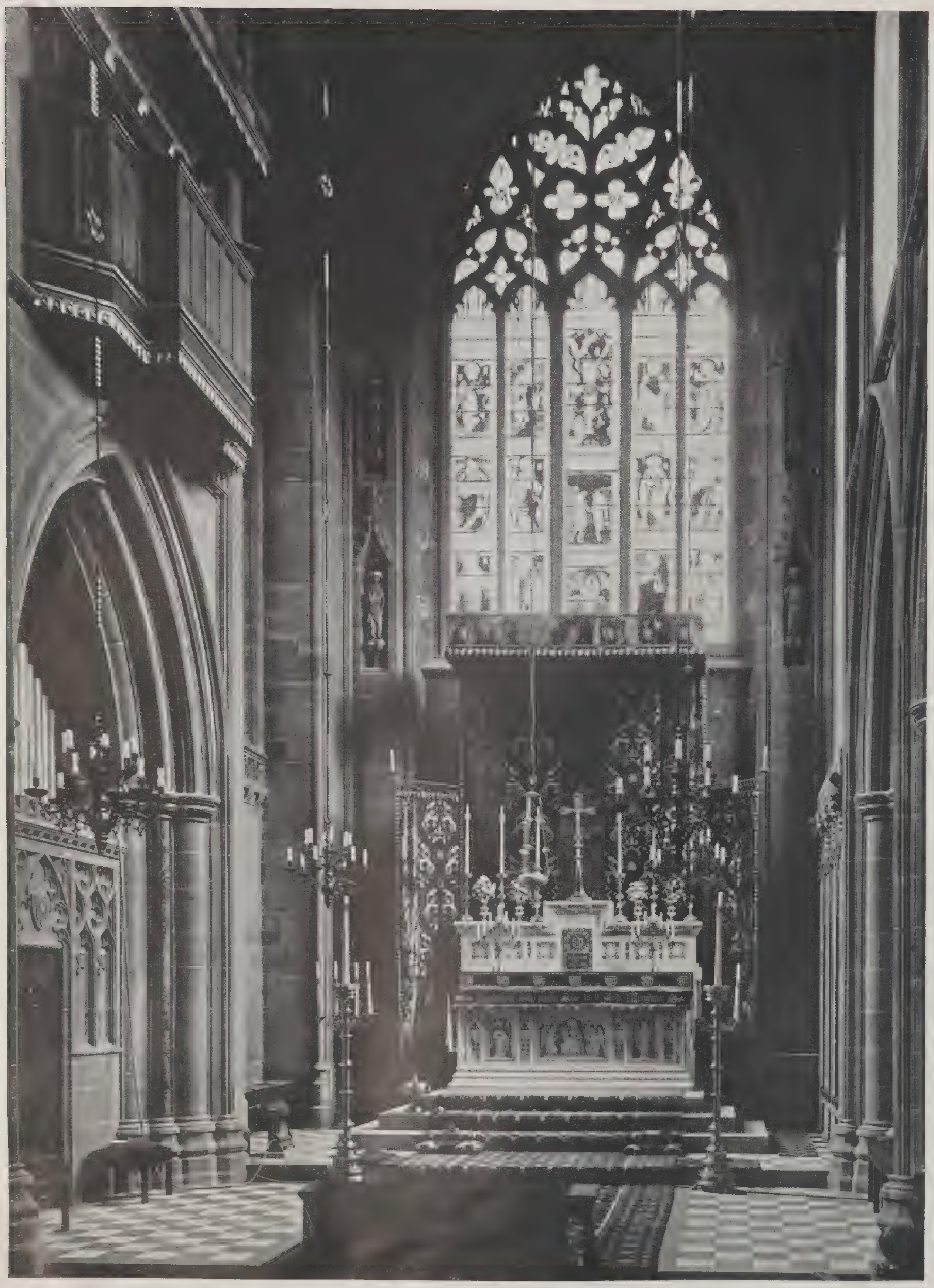


Altar and Reredos, St. Thomas', New York

Bertram Grosvenor Goodhue, Architect

The prejudice against columns is, like that against length, without foundation in fact. It is only a theory that people do not like to sit behind them, and I fancy it arose out of the jealousies engendered by the bad old custom of rented pews, now largely relegated into oblivion. A church is not a theater; seeing is not the only way of worshiping, and neither is hearing for that matter. With the growth of a more spiritual sense of religion after the dark days of modernism, these prejudices are gradually being abandoned and will ultimately disappear. On the whole, therefore, I think I can repeat that the general type of church acceptable for the first fifteen hundred years of Christianity may be accepted today as entirely adequate, practically without any changes compelled by modern conditions.

Allied with this consideration is the question of style. This is so large a subject and spreads out so widely that it is impossible to consider it here in detail. Of course we ought not to be obliged to question the matter at all; we ought to be able to build almost instinctively, as men built in the past, but equally of course we are not able to do any such thing. The sequence was cut as with a knife, and for three centuries the natural creative impulse along artistic lines has been moribund and we have had to act with explicit self-consciousness and artifice. Somehow we have to get back to better ways, and lacking a better, it seems to fall to archi-

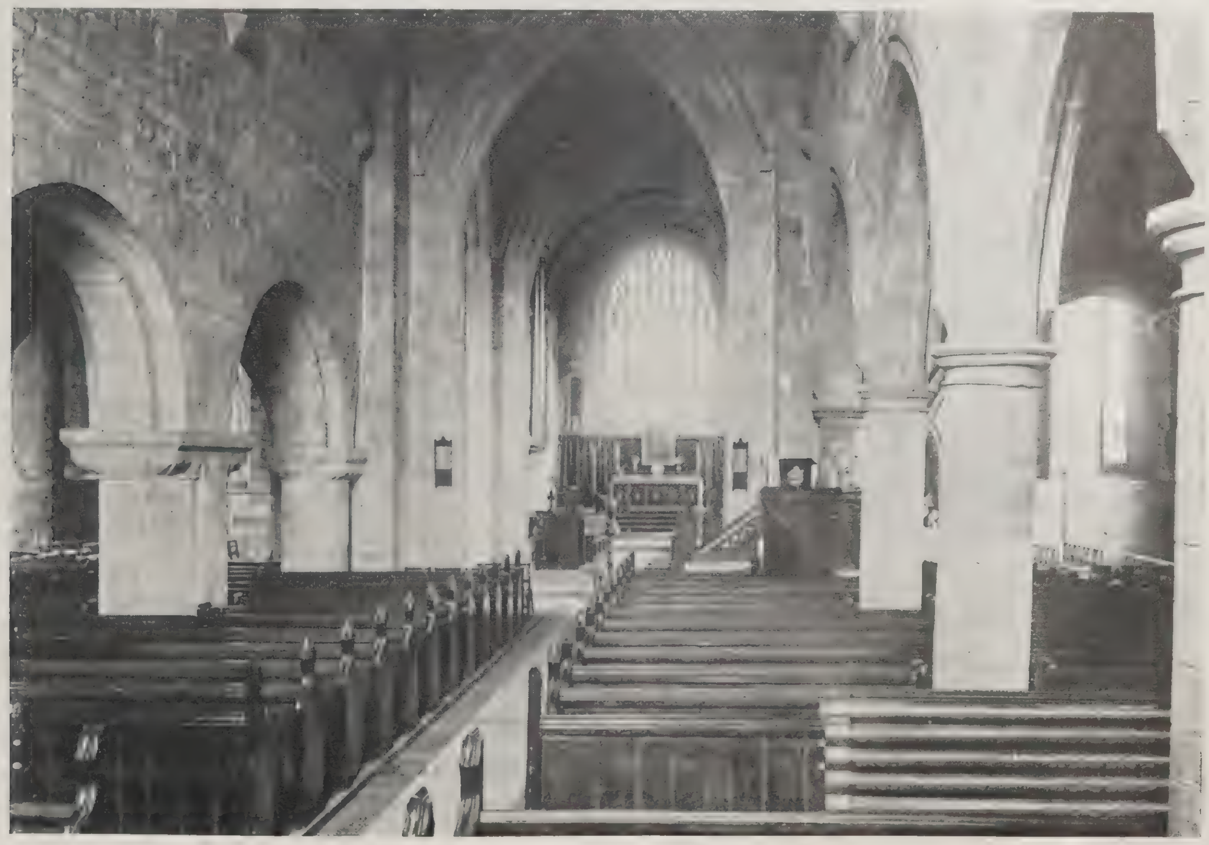


SANCTUARY OF A MODERN ENGLISH CHURCH
DORSAL, RIDDELS AND TESTER EMPHASIZE DIGNITY OF ALTAR
G. F. BODLEY, ARCHITECT

tects to assume this part of leadership, at least so far as the designing of buildings is concerned.

Hitherto there had of course been no such thing as one specific style for churches and another for secular buildings; at least this was true up to about the year 1825—and not only in America but everywhere else. So long as Europe had substantial unity, not only in religion but in its social organism and cultural standards, i. e., to the beginning of the sixteenth century, this was inevitable, for religion was as much a part of life as fighting, love-making and play, so the only variants grew out of racial, climatic and traditional differences. When Europe began to break up a new style in art had come into fashion, establishing itself everywhere, and as the new and constantly dividing religions seemed to possess nothing of that peculiar spiritual energy which revitalizes an art or develops new form; as it inflexibly set itself against beauty in all its aspects, and as it took over to its own uses the old churches instead of building new ones, nothing happened in architecture except—when the rare occasion demanded, as the great fire of London—submission to this new fashion of building, whether it was appropriate or not. Puritanism in America did produce an interesting variant of the latest English Renaissance, more nearly expressing current theology and ethics than anything that had happened before, but it was an exceedingly narrow and crabbed style and beautiful rather in contrast with what immediately followed than with that which had gone before.

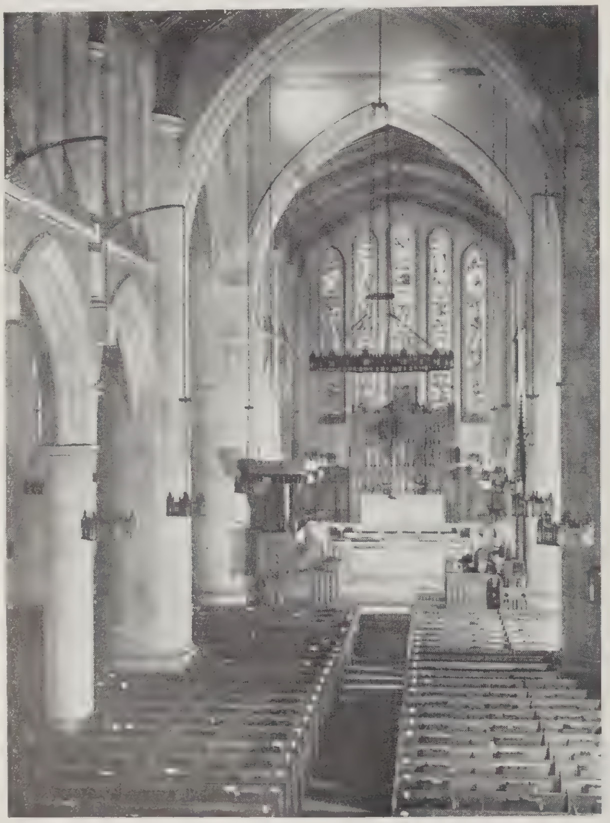
When the romantic, neo-mediæval and Catholic movements began in Europe early in the last century it became immediately necessary to invent or return to a style more consonant with the new principles and ideals invoked, and of course the Gothic revival ensued. This went forward most successfully in England for 75 years, achieving a high point of excellence, and the same thing was true in other European countries and in America with less happy results. Richardson threw his big monkey wrench into the rather makeshift machinery of the Gothic revival in this country, and for 20 years the anomalous but intriguing style he had made his own held the field, finally dying out in the ineptitudes of his breathless camp followers, when Gothic resumed its sway and has continued until today, extending its domain over every known kind of Protestant denomination (except Christian Scientists, Mormons and Quakers) and only during the last 20 years finding its sovereignty disputed by newly recovered styles. These are: the original Colonial, a modified Lombard with occasional Byzantine infusions, and the late Spanish Colonial type more or less suggestive of Mexico and the California missions. The result of course is fairly chaotic and far from convincing. In any good-sized city you may find, almost side by side: a Roman Catholic church in "Plasterer's" Renaissance; an Anglican church from the Ile de France; a synagogue after the Arabic



The Building of Churches Often Covered Centuries

Note the round arches at left and the pointed at right mode (?); the Third Presbyterian in the style of the Auvergne; "Dr. Whipple's Church" (Unitarian) in English Perpendicular; the Main St. Tabernacle (Calvin Baptist) in a very delicate form of twelfth century Italian Lombard, and a Christian Science temple in pure Carnegie.

Well, what are we going to do about it? There is something wrong somewhere, but, assuming a virtue if we have it not, we still proclaim this a free country, and the right of private judgment extends to art (particularly architecture) as well as to Biblical exegesis and the interpretation of creeds. Fortunately, I have to deal only with the architectural expression of liturgical churches, and to me the answer here is limpid in its simplicity. "Go on from where you left off." By which I mean something like this. If the church is of the Anglican rite, pick up English Gothic where it was cut off at the time of Henry VIII, but do not stop there. The whole field of Gothic is available; find beautiful things where you can, and try to mould these varied beauties into a consistent whole, but do not stop there. The Catholic Church (of which Anglicanism claims to be a part) is a living organism, and three centuries have passed since the extinction of King Henry. Do try to get something that gives the note of life and of contemporaneousness. It can be done; witness Gilbert Scott's Liverpool Cathedral, to come no closer home. Other styles seem to me artificial, unless perhaps climate and local tradition justify a Spanish or Mexican cast in the Southwest. Even this does not seem very logical when you think of the genius of Anglicanism, but logic is sometimes a synonym for death, and I fancy that if I had the chance I should do a Spanish Renaissance Episcopal church in New Mexico or southern California, forgetting the Anglicanism and remembering only the Catholic norm.



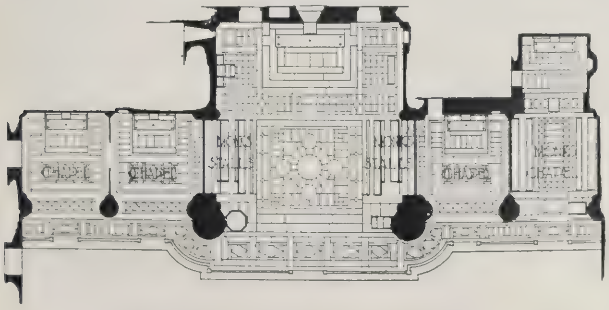
St. Paul's Cathedral, Detroit
Cram, Goodhue & Ferguson, Architects

The Roman Catholic problem is only a little less simple. Of course all Christian architecture, like all Christian art, is the product of Catholicism, so the field of precedent is somewhat extended. Also the racial strains that go to make up the Roman Catholic Church in America today, are varied in the extreme, and for these two reasons the obvious deduction is not so clear as in the case of Anglicanism which, but for its brief flirtation with Romanesque, has held steadily true to English Gothic, or as it should be in the case of the denominations that derive directly from Puritanism. When the Catholic artistic recovery began about ten years ago it was led by able architects along various lines, Gothic, Lombard, Byzantine, with notable results, but it was all *architects' work,* and good as it is it certainly lacks that quality of unity and conviction one would expect in this place. At present it is sometimes impossible to tell the Fourth Presbyterian, the Episcopal St. Alban's, the Unitarian All Souls' and the Roman Catholic cathedral, the one from the other, so far as their externals are concerned. Perhaps it is not necessary, but one somehow feels that a Catholic church ought so to express itself to the passer-by. One is inclined to urge a consistent return to the universal Gothic of Catholicism, at least as a point of departure, as the Anglican Church has done, for after all, Byzantine and Lombard are old stages passed on the way, while the Renaissance of Italy is hardly consonant, in its associations and implications, with the Catholic Church of America today, and certainly the modern French adaptation of this style is still less significant. The great trouble is that the Roman Catholic Church has too wide a field to draw on, too many great styles to its credit. Perhaps it is too soon to look for clear leading and consistency; the dark ages of artistic barbarism are too close at hand. Sooner or later, after various interesting experiments, there may come a settling down to a sound basis, and a new thing may grow out of Byzantine, Gothic or Lombard, which will yet be the old in new guise. After all, this is the principal point to be remembered: the liturgical church represents a living organism with a continuity that reaches back to the Feast of Pentecost; therefore the style must express this fact, but it must also adapt itself to modern conditions, for this is the genius of the Church; immutability in essentials, adaptability in non-essentials, and unchanging in a changing world.

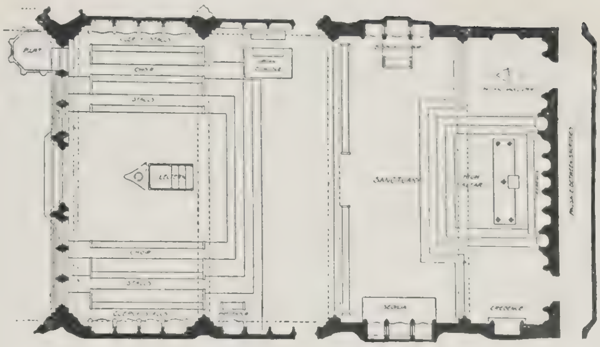
This consideration has a bearing not only on style and on the general organism of the church, preventing the use of pagan forms (old or new) and the adoption of strange theatrical plans or dispositions, but as well on the question of modern inventions in construction and the use of substitute materials. The liturgical church, because of the peculiar nature of its doctrines and its worship, cannot consistently employ cheap substitutes for anything, or imitations or deceptions in any form, for this takes on the character of sacrilege. This rules out steel or concrete construction overlaid with imitation masonry, while a new style cannot evolve from these admirable structural expedients because so would wholly be lost the sense of tradition, history and continuous life. In this category of church building honesty is the only course that can be followed. I suppose it is hardly necessary to say that here also the fad that seems to be spreading elsewhere, of combining in one inharmonious whole a church and a hotel or office building or other revenue-producing investment, is forever and irrevocably barred.

In any church there must be a real unity and coöperation among the several arts, but the opportunity for this is greater here than among the non-liturgical denominations. Not only may every art be used to the limit, but each must be transfigured by its function, for here everything is symbolical, down even to the smallest element of ornament in carving or color. Several of the arts have lagged far behind architecture in the great process of recovery, particularly painting and sculpture, and as architecture, when called into the service of religion, cannot do without these arts, it is desirable that in some way they should catch up. Unfortunately, the art schools are almost as oblivious of religious art as were the architectural schools 20 years ago, so the opportunities for training are reduced to a minimum. Well, in spite of the high disfavor of the academic institutions, architects did manage to become great church builders, so there is no reason why painters and sculptors should not win equal success under similar conditions.

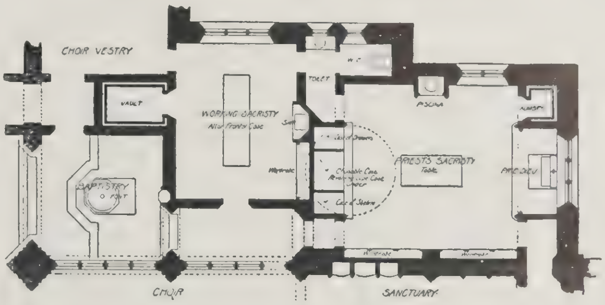
Now it may be admitted at once that certain of the principles here laid down will not find willing support from some clergy and vestries and building committees. During the past century the customs and theories of Protestantism have crept into the liturgical churches, particularly the Episcopalian, with results that were fast bringing them into line with Evangelical structures. The prejudice against columns, the intrusion of side and transept galleries, the reduction of the sanctuary into a mere platform or niche, the elimination of subordinate chapels, altars and shrines, even the fear of a long nave and a high roof—all these infelicitous things held for a while, and are still to be encountered here and there, but they must be met with firmness and their irrationality demonstrated, for one and all they strike at the root of that quality which distinguishes the liturgical from the non-liturgical churches.



Suggestion for Choir and Chapels



Plan of Typical Choir and Sanctuary

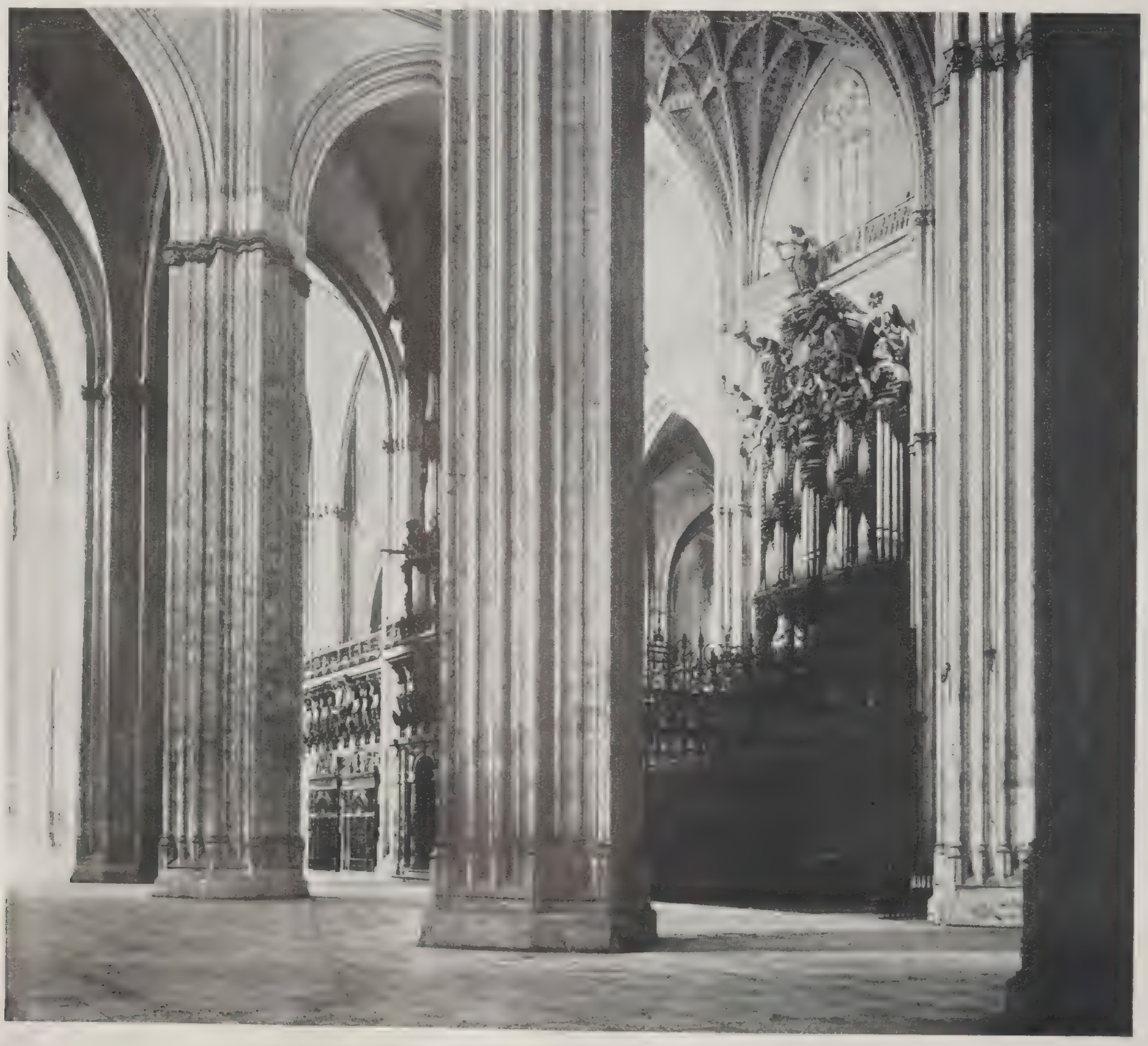


Arrangement of Priests' Sacristy, Baptistry, and Working Sacristy

I shall not try to lay down a series of simple rules to guide a young architect who has never been to a Catholic Mass and whose knowledge of the Episcopal Church extends perhaps to assisting at "High Matins" once in a while. It cannot be done. It would be easy enough to epitomize "The Parson's Handbook" (that excellent work by Dr. Dearmer) and tell all about the arrangements of a chancel and sanctuary; what should be the dimensions of an altar, the disposition of its tabernacle, gradine, foot pace and steps; where the sedilia ought to go and the credence and the piscina; the place for a sanctuary lamp, the function of a reredos, the nature and purpose of parclose screens, and all that sort of thing, but what would be the use if the names meant nothing and the youthful practitioner were substantially ignorant of the informing dogma, the reason for and nature of the established devotions, the history and tradition that go back for more than 15 centuries? The way to learn how to build a liturgical church, Roman, Anglican or Orthodox, is to become steeped in the religion itself both in theory and practice, and then become familiar with the long sequence of church building back to the Edict of Toleration. There is no teaching in architectural schools that gives assistance along these lines, fruitful (and profitable) as they are; one must pick it up for oneself.

It is a field worth investigating. Apart from certain spiritual benefits, the demonstration of which forms no part of the function of this paper, there are other considerations of moment. Much of the work architects are called upon to do is ephemeral; the thing built today may be scrapped in 20 years. I myself have seen three buildings (the first by McKim, Mead & White) constructed in succession on one street corner in New York. Liturgical churches are apt to be reasonably permanent; they do not, like the beautiful Presbyterian church in Madison Square, rise only to fall and give place to a life insurance building. With them one builds for centuries. Again, by their very nature they must have dignity, majesty, beauty if it is only the beauty of mass and composition and texture of materials. They are not likely to be involved in a dominating maze of "institutional" adjuncts or compromised by commercial adhesions. Finally, they must have historic suggestiveness as well as propriety, and this means the chance to go back and study great styles, finding out why they were great and where their beauty inheres, after which—to go on and see how "these dead bones may live" through the infusion of something of the vital present.

I do not suppose there is a greater opportunity in architecture than just this of serving the liturgical churches, particularly now that the Roman Catholic Church is seeing the error of its old ways ("old" in the sense of the last two centuries) and is now coming forward to demand the best architecture and the best arts that are obtainable. There is no doubt about it; in spite of Fundamentalists and Modernists, religion is coming back, and the wise man will prepare himself to serve this reëntrant force, not only for the compensation there is in it—both in point of fame and pay—but because it is a joy in itself and a dynamic contribution to well-being.



Organ in Choir, Seville Cathedral
Renaissance ornament in Gothic church

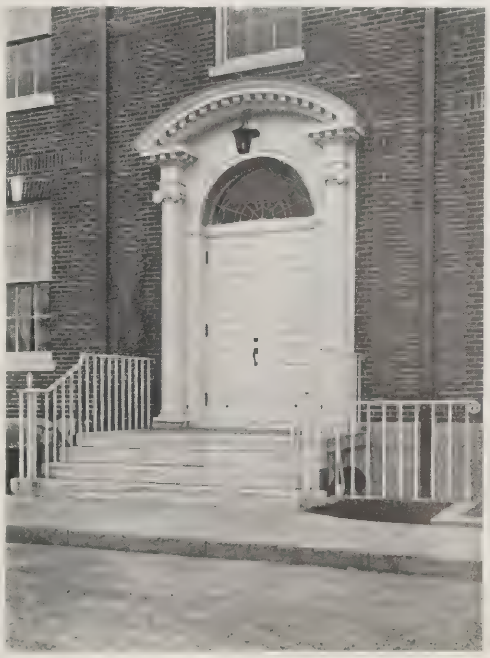
# Institutional Churches

*By* JOSEPH HUDNUT

*Professor of Architecture, University of Virginia*

BY the "institutional church" I understand that type of church, existing in almost every denomination, which is primarily devoted to some kind of social usefulness; a church which, conscious of its obligations to society no less than to the individual, does not confine its activities to public worship and the administration of the sacraments, but actively fosters every good tendency in human thought and feeling.

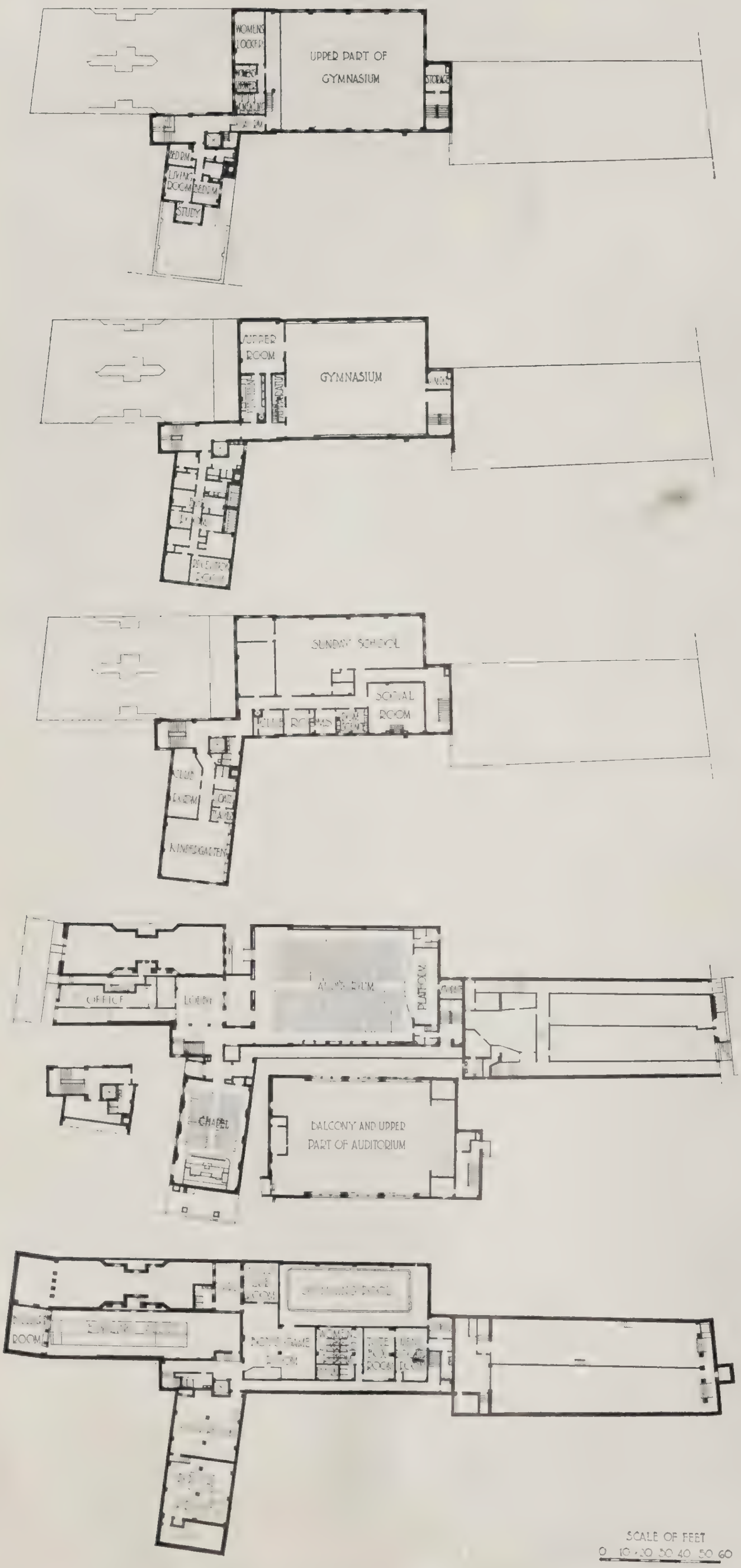
I think of the institutional church as one which, because of its concentration on a more exigent task, is indifferent both to dogma and to ritual. It is not, in great measure at least, concerned with the Hellenistic and scholastic subtleties with which the teachings of Jesus are overlaid, the doctrines which crystallized at Nicea, Heidelburg, or Westminster; nor is it absorbed in the artistry of its service, in forms and methods of procedure, in making more dramatic a certain kind of religious experience. Nor is it intent upon the interpretation or advancement of some hierarchic authority. It is devoted rather to a practical effort to translate the profound and beautiful morality of Jesus into such luminous and compelling terms as to make it an active agent in the social life of our own time.



**Doorway to Parish Building, Congregational Church, Wellesley, Mass.**

Carrere & Hastings, Shreve & Lamb, Architects

The principle which underlies the activities of this type of church is the conception of life as a unity. Life cannot be divided, except in the imagination, into "religious," "social," and "educational" experiences, nor can any of these experiences be cut up into emotional, intellectual, and physical elements independent of each other. True religion is not a code of ideas and philosophic principles; nor is it an emotional exaltation or æsthetic pleasure felt in prayer or song or ritual. Religion is a way of living, in the manner in which we recognize God in our lives. It is something which touches us at every moment of consciousness, in every human relationship. The institutional church recognizes this immanent and universal pervasion of religion through



Floor Plans, Church of All Nations, The Bowery, New York
Julius Gregory, Architect

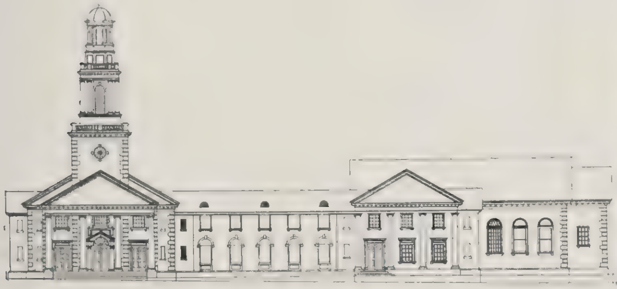
life. Like the mediæval church, therefore, it is concerned with every activity of life; with social intercourse, teaching, entertainment, recreation, organized charity, music, art, and the drama. Unlike the mediæval church, it does not attempt to subordinate these to the requirements of its own existence; its purpose is rather to inform all of life's activities with the quickening spirit of Christian truth, as the thinking men of our own day see that truth. The church is to be the great educator, not of man only, but of man's institutions. The Christian spirit is to be felt deeply, though unconsciously, in every human activity, becoming less a code applied to life, less a form or ceremony outside of life, and more a habit of life.

These ideas, which are those of the spiritual leaders of the church rather than of the masses of church members, have led to a new conception of what is required in a church building. The churches of the past century, which comprised little else than a great meeting hall embellished with the sentimental vagaries of the "Gothic revival," are wholly inadequate for this new usefulness. Even less adequate are the churches which are designed, after the models of mediæval churches, primarily as a setting for a liturgy; churches which are, in fact, only an extension of a liturgy into stone and wood, a concrete expression of its symbolism. The modern leaders are likely to be a little impatient with an architecture of symbolism, even a beautiful and ancient symbolism, if it is found to be costly, ineffective and troublesome. Especially are they impatient with an architectural symbolism which no longer possesses any meaning which can be understood by men of our own day or which, being understood, has no longer power to kindle the soul or even to touch the imagination.

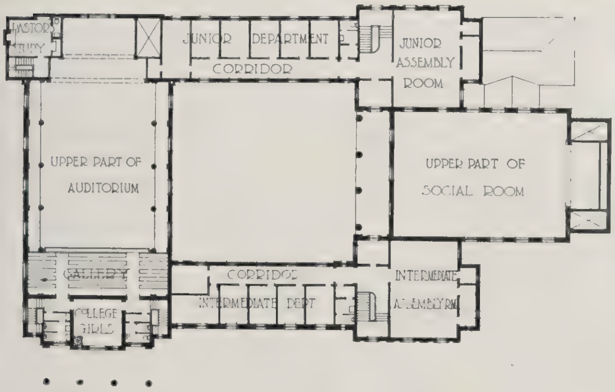
What is wanted for the institutional church is a building that is more than a house for preaching and for worship; a building that may be dedicated to every good work that can enhance the sum of human happiness. It is to be associated in some way with every right exercise of man's social, intellectual, and physical powers. Schoolrooms, recreation halls, clubrooms, and entertainment rooms are as relevant as is the large assembly room for those who participate in religious rites enjoyed in common; our worship of God is to be just as manifest in the one as in the other, and just as acceptable to Him.

No longer therefore is the church building to be only a great monumental hall; no longer only a mighty symbol; it is to be a grouping of educational, social, and recreational facilities; that is to say, of religious facilities. It is to be a social center, a composition of a hundred rooms, various in size, arrangement and design, as are the social energies of man, but fused together by a common spirit and a common dedication. The point of view of the men who are directing this vast integration is a practical and immediate one. They want a useful building, organized like any other useful building of our own day, in a straightforward and simple way. They want the arrangement of rooms, the circulation, the construction and the decoration to be governed by the requirements of the particular usefulness which they have in mind. Christianity is a practical doctrine closely related to life, and it demands in architecture neither a traditional posture nor a romantic expression. A church building is a tool to be used in a greater and less visible construction; a weapon to be kept bright and keen for service in a persistent battle against the terrible evils that exist in human society.

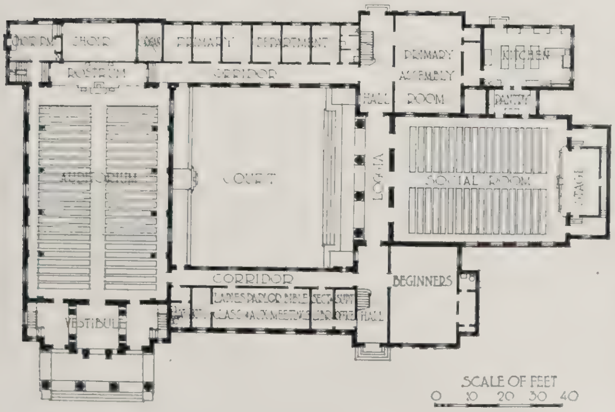
Perhaps if we could place ourselves outside of our own time and view it from afar we should see in these somewhat anarchic buildings of the institutional church the beginnings of that great adapta-



Main Elevation

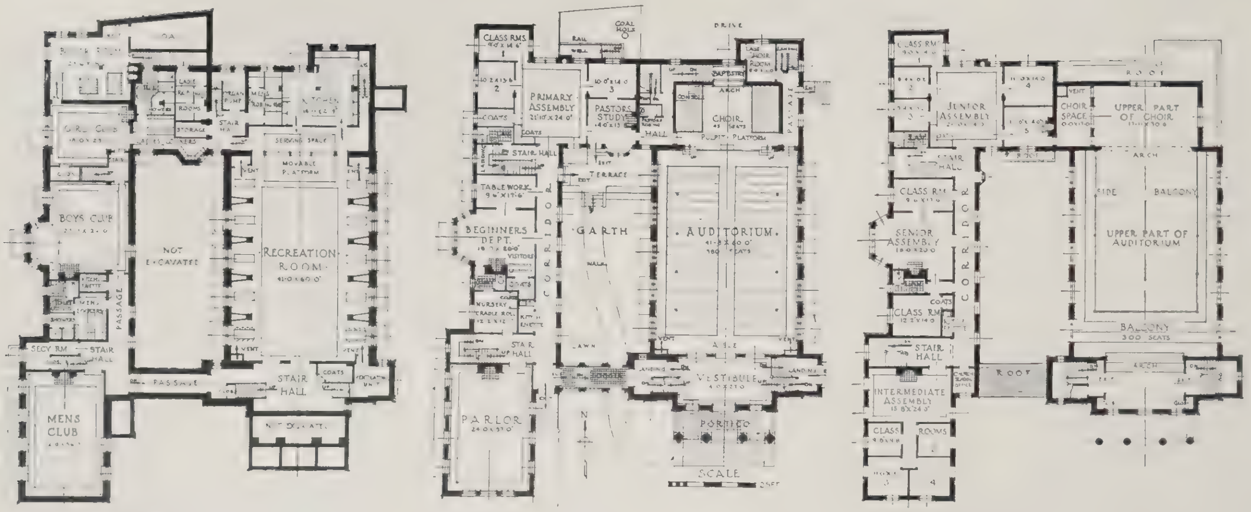


Upper Floor



Rivermont Avenue Presbyterian Church
Lynchburg, Va.
**Joseph Hudnut and Craighill & Cardwell, Architects**

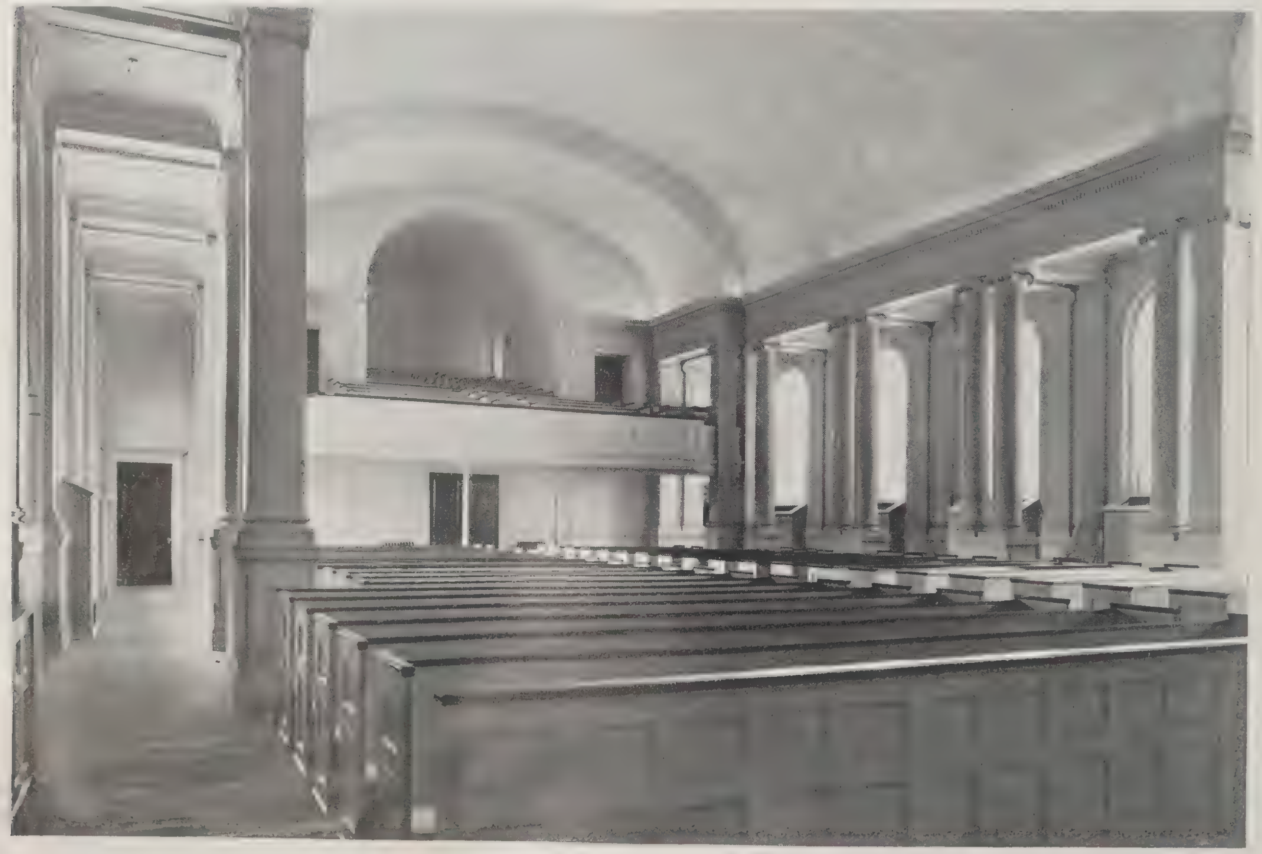
Side View of Portico and Spire
Congregational Church, Wellesley, Mass.



Basement Floor Plan Main Floor Plan Second Floor Plan

Lafayette Avenue Baptist Church, Buffalo
Frank A. Spangenberg, Architect; Earl Martin, Associated

tion. Perhaps we should see here the materials of that great rhythm in which the idealism of our day will some time define itself, the first intimation in architecture of that synthesis between science and emotion which is to characterize the religion of the future. The joyous and practical architecture which will express this synthesis will originate from some new demands of usefulness. It will be organized upon a modern principle and designed with a modern respect for tradition and enthusiasm for progress. We cannot of course say what force will reduce its useful and practical structure to significant harmonies of line and form and space, but that force will not be a conscious or archæological force. It will be the same spontaneous and implacable force that gave grandeur and sublimity to the useful structure of Amiens, for architectural forms grow out of the requirements which they must meet.



Auditorium, Looking Toward Narthex, Congregational Church, Wellesley, Mass.
Carrere & Hastings, Shreve & Lamb, Architects

# Plan and Design of Christian Science Churches

*By* WILLIAM EDGAR MORAN

*of Goodwillie & Moran, Architects*

IN considering the design and planning of Christian Science churches, it is necessary, primarily, to understand something of the history of this religious body, its differences from other Churches, and the fundamentally distinctive manner in which its organization functions.

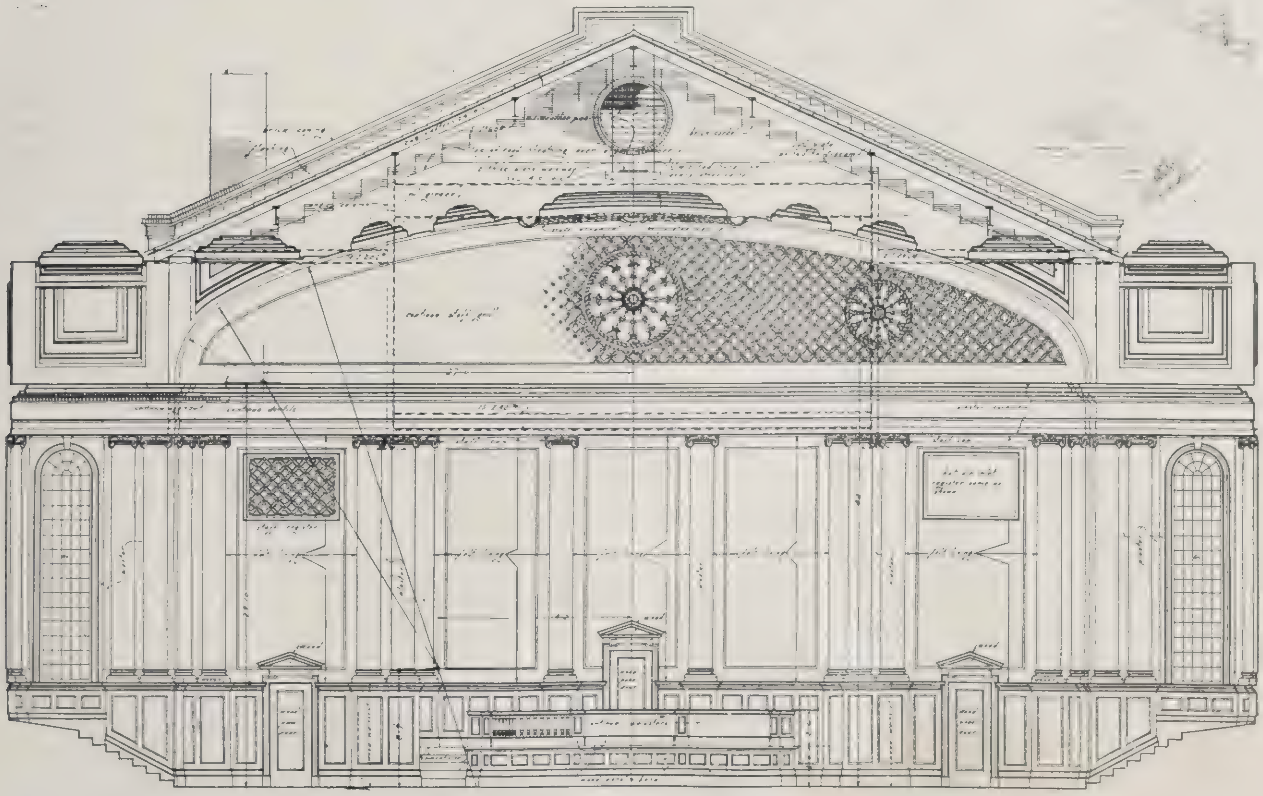
Historically, it must be noted that the principles of Christian Science were discovered in the year 1866 through the inspiration of Mary Baker Eddy. The original church of this denomination was not chartered until August 23, 1879. The earliest church in use was that built at Oconto, Wisconsin, in 1886, a small frame structure; while on September 29, 1892, when reorganizing the Church, Mrs. Eddy gave the plot in Boston on which the present Mother Church stands. On this plot in 1894 a building was erected for the individual purpose of church services, and in eight years the church had so grown as to need greatly augmented space, which led to the laying of the corner stone of the extension in 1904.

From this beginning in the one small church of 1879, the erection of Christian Science churches has continued and extended, not only all over this country but also throughout the greater part of the civilized world, until today the number exceeds 2,000 churches, a growth unparalleled in religious history.

Although the Christian Scientists, as has been noted, trace back their actual religious organization only to 1879, their belief, insomuch as it differs from that of other Protestant bodies, is a return to the teachings of primitive Christianity, with an entire absence of the formalism which, through the course of the 1600 years since Constantine made Christianity the State religion, has been added to and become a great part of the orthodox ritual, both Catholic and Protestant.

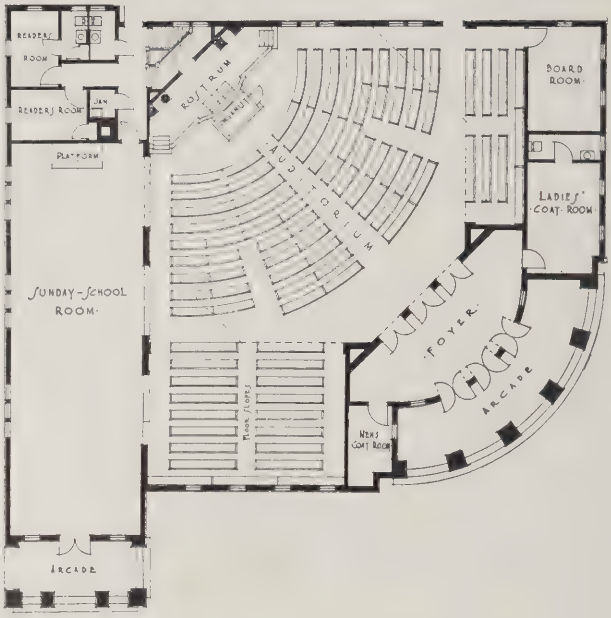
In their organization, each of the branch churches is a pure democracy. The church organization comprises a board of trustees or directors elected for three years, so that a majority remain in office from year to year; two readers, a clerk, and a treasurer. The readers are also elected tri-ennially, and, by a wise provision, are precluded from more than one term of service. By this means the opportunity for service to the church is widened. There are no professional pastors or priests, all the officers being elected for stated terms by secret ballot in annual meetings. There are various committees to which the actual work of the church is delegated:—ushers, house, publication, etc., all selected annually and usually non-succeeding.

Another great divergence lies in the complete lack of all forms of so-called "social service," which has grown to such an extent in the orthodox



Transverse Section Through Auditorium, Looking Toward Rostrum
First Church of Christ, Scientist, Los Angeles
Elmer Grey, Architect

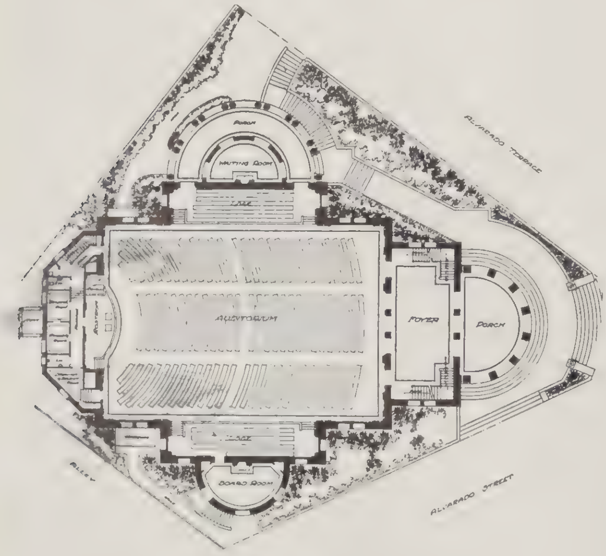
churches as to be of importance almost equal to the religious service, so that it has become necessary to make a sharp division between religious and secular work. The Christian Science Church work, in this sense, lies rather along outside welfare lines, as instanced in the activities attending the Japanese and Halifax disasters and the World War; thus the work does not require special equipment, thereby obviating the necessity of providing for guilds, cadet corps, parish house activities, and other forms of purely secular service. There is another feature of the Christian Science services which is not commonly met with elsewhere; that is, the practice of "visiting" or meeting which goes on before and after the services; but the greatest distinction to be noted is the custom of giving public testimony at the Wednesday evening services, and, as has been said, the entire lack of ritual and form in the conducting of the service itself.



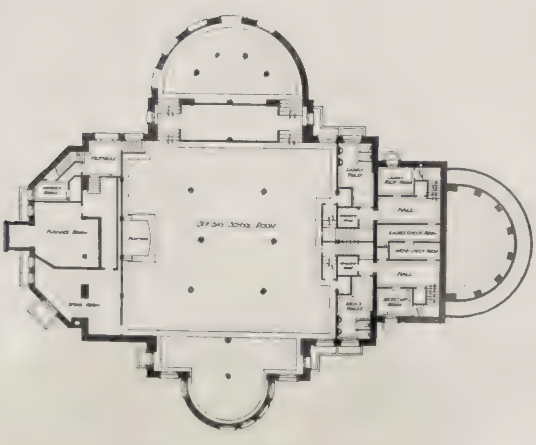
**Excellent Example of Semi-circular Plan**
Note ample areas of foyer and Sunday School room

To properly plan a Christian Science church, therefore, a comprehensive knowledge of all these distinctions must be borne well in mind, even before the exigencies of site and cost are considered. As the chief feature of the service is the reading of the Bible and Mrs. Eddy's "Science and Health with Key to the Scriptures" from the desk by the two readers, the building must be planned to make the platform the focal point of the plan design. This does away with all possibility of the use of what has been termed the traditional or elongated plan, which is so appropriate in churches where the service is mainly read by priest and the worshiper and where the sermon is only one part of the service. This difference in scheme of worship does away with any need for chancels, transepts, naves, choirs, etc., which make such beautiful plans, and which add so much to the fascination of the Gothic cathedrals. The requirements of the Christian Science services lead rather to the square plan of auditorium, similar to one type of denominational church plan, which rarely makes extreme length a feature; so that, in consequence, in the first analysis, a plan in which all the seats would be at an equal distance from the reading desk, thereby attaining equal sight and hearing for all, would be ideal from all points of view.

At this point, it is necessary to consider the feature spoken of before, that of the testimonial meetings. At these meetings anyone in the congregation may, as he or she desires, arise and speak on subjects relative to Christian Science, and this brings out the absolute necessity for the greatest degree of acoustical development to make a serviceable church, and it is this requirement which in the final analysis gives as the ideal plan a semi-circular space with the readers in the center, approaching the semicircle, along the lines used in "academies" and the like. As a general precept, one might say that the church plan of the auditorium or audience hall type, as suggested in certain plans shown here, should be



First Floor Plan



Basement Floor Plan
First Church of Christ, Scientist, Los Angeles

the basis of all planning for Christian Science places of worship. This is, to a degree, true.

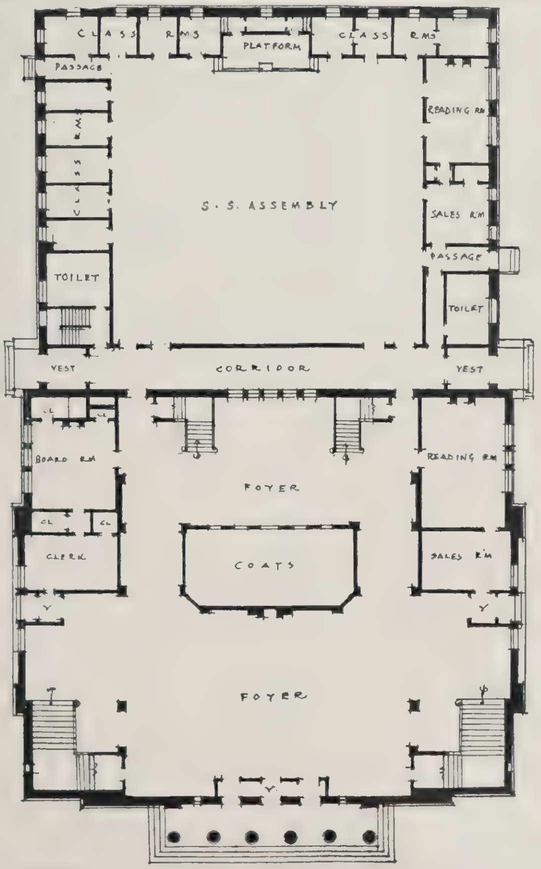
Granted the auditorium scheme, it follows that there should be an entire absence of supports which would break the vision and interfere with hearing of the reading, and this has led through several ramifications to the use of the sloping floor plan, in which the entire body of the church is comprised on one floor, sloping toward the readers' desk, with ramps and stepped aisles, and without the use of galleries. This plan I believe to be an individual feature of Christian Science churches. It has several claims for attention: First, that the entire congregation is on one floor. Second, that the view of the individual is, by means of the sloping floor, well taken care of. Third, it eliminates galleries with their resultant reverberations. It is, however, most difficult to design an interior satisfactorily with this scheme, and the extreme sloping floor is not so comfortable to stand on in the visiting periods referred to previously.

The first church edifice, called the "Mother Church," in Boston, followed in general design and plan the orthodox layout. It had a tall tower, was built of somber granite, and with its stained glass windows could hardly be distinguished, especially in its external aspect, from a building of the Congregational or some other orthodox body. This plan was followed by the Concord church, but in planning the extension to the Mother Church, an entire change of scheme was made. Instead of Richardsonian precepts being followed, recourse was had to earlier precedents and a building more nearly approaching the early Christian churches of Rome was achieved.

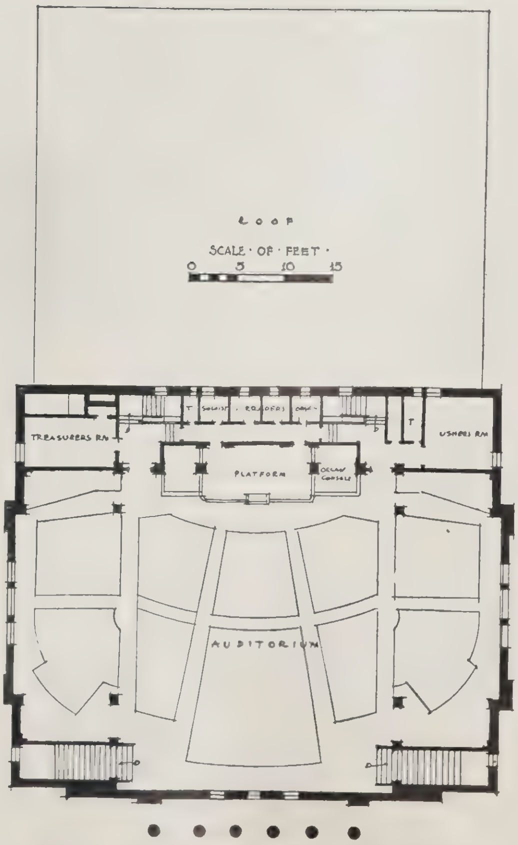
The basilica type plan, as shown in these pages, has proved satisfactory in a greater or less degree, and is perhaps more economical in construction than the true audience hall variations, but it is defective through the necessary use of columns, which are most undesirable. It is, however, possible to provide for it an interesting interior development, and it approaches more nearly to what might be termed the traditional type of the Christian church, for we know that the earliest Christian church was erected under the rule of Septimus Severus, about 180 A.D., and therefore the basilican plan undoubtedly provided the inspiration for early Christian designers.

The plan of the Mother Church extension, generally circular, has been followed in several instances, as shown here. This scheme traces its architectural lineage from the Pantheon in Rome, the Temple of Vesta, and other circular temples. The feature of "visiting" has brought about the incorporation of generously large foyers, as it is here that a great deal of the healing work can be done.

Instead of varying forms of the sacristy, robing room, etc., the requirements back of the platform



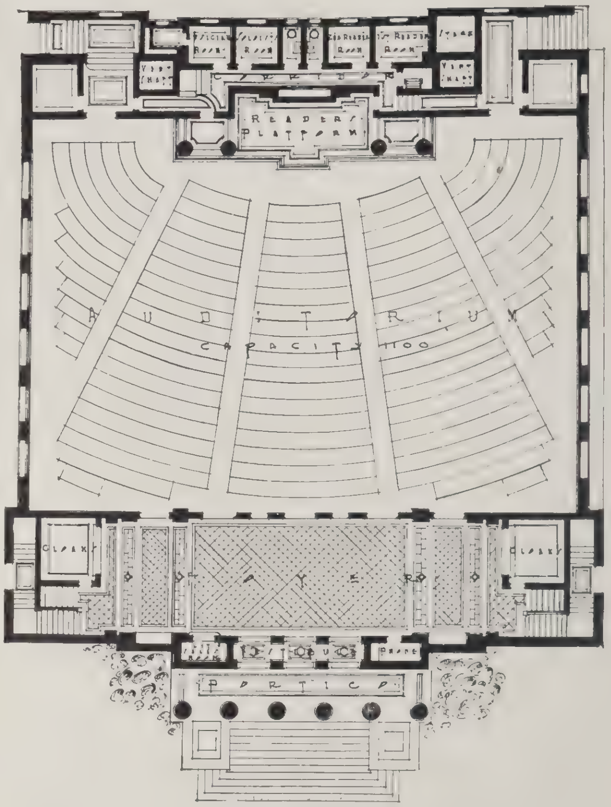
First Floor Plan for Christian Science Church
Unusual provision for social rooms



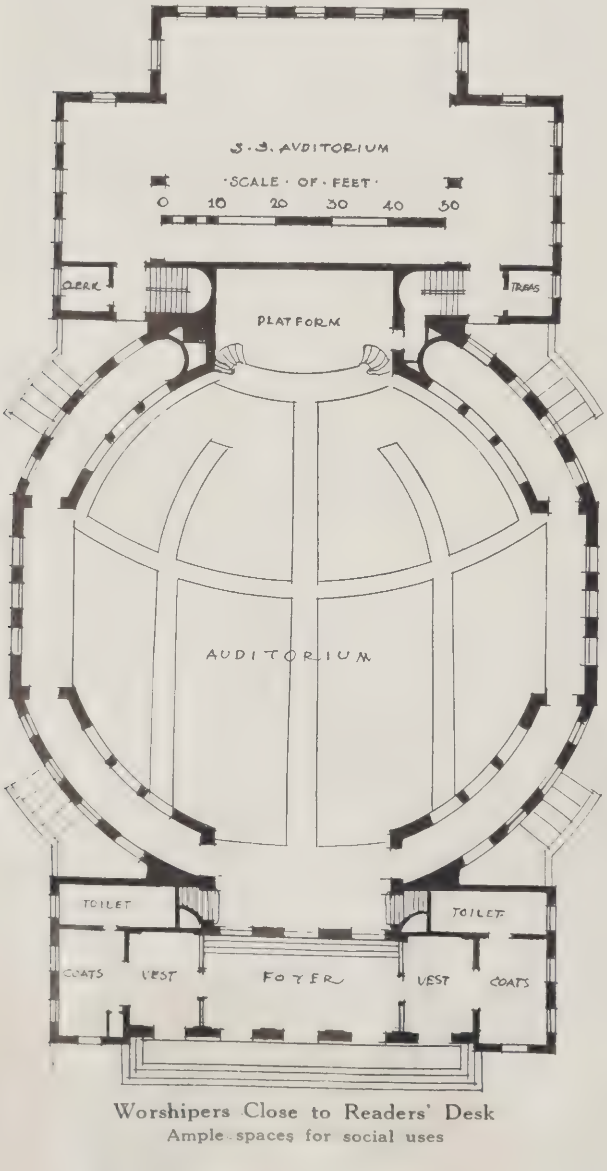
Main Auditorium Placed on Upper Floor
Note nearness of worshipers to desk

are uniformly simple; small rooms for the two readers must be provided, and one or two rooms for the organist and soloist, with adjoining toilet facilities. The organ is usually arranged in a gallery above the reading platform, and in size this platform is reduced to a minimum, there being no need for greater depth than will accommodate the readers' desk and chairs. In some cases, the soloist (a choir not being customary) also occupies a chair on the platform, and the organ console is concealed below the platform level. As there are no formal services for christenings, weddings or funerals, connection between platform and church need not be direct.

The extra-service requirements of the church are simple; off the foyer must be provided ample coat rooms and toilet space; a board room of such size as will accommodate the requisite number of directors or trustees; an ushers' room where they may hold their preliminary services; and a treasurer's or committee room should be provided; and reading and sales rooms for the dissemination of church literature are sometimes made part of the church plan. The relation of the Sunday School to the church is of extreme importance, and with the increased development of this work, growing stress is being laid upon proper arrangements being made for this department of the church organization. The double-level arrangement, in which the Sunday School occupies the ground floor, with the church foyer in the front giving access by means of stairs or ramps to the main auditorium, which occupies the so-called second floor, is quite common, and with limited ground space perhaps solves the problem satisfactorily. The ideal arrangement, however, consists of a separate building, connected by corridors to the church proper. In this wing should be provided space for the infant class, certain individual classes and a general auditorium, to be used by arrangement of seating for class instruction, as well as for the services before and after study periods.

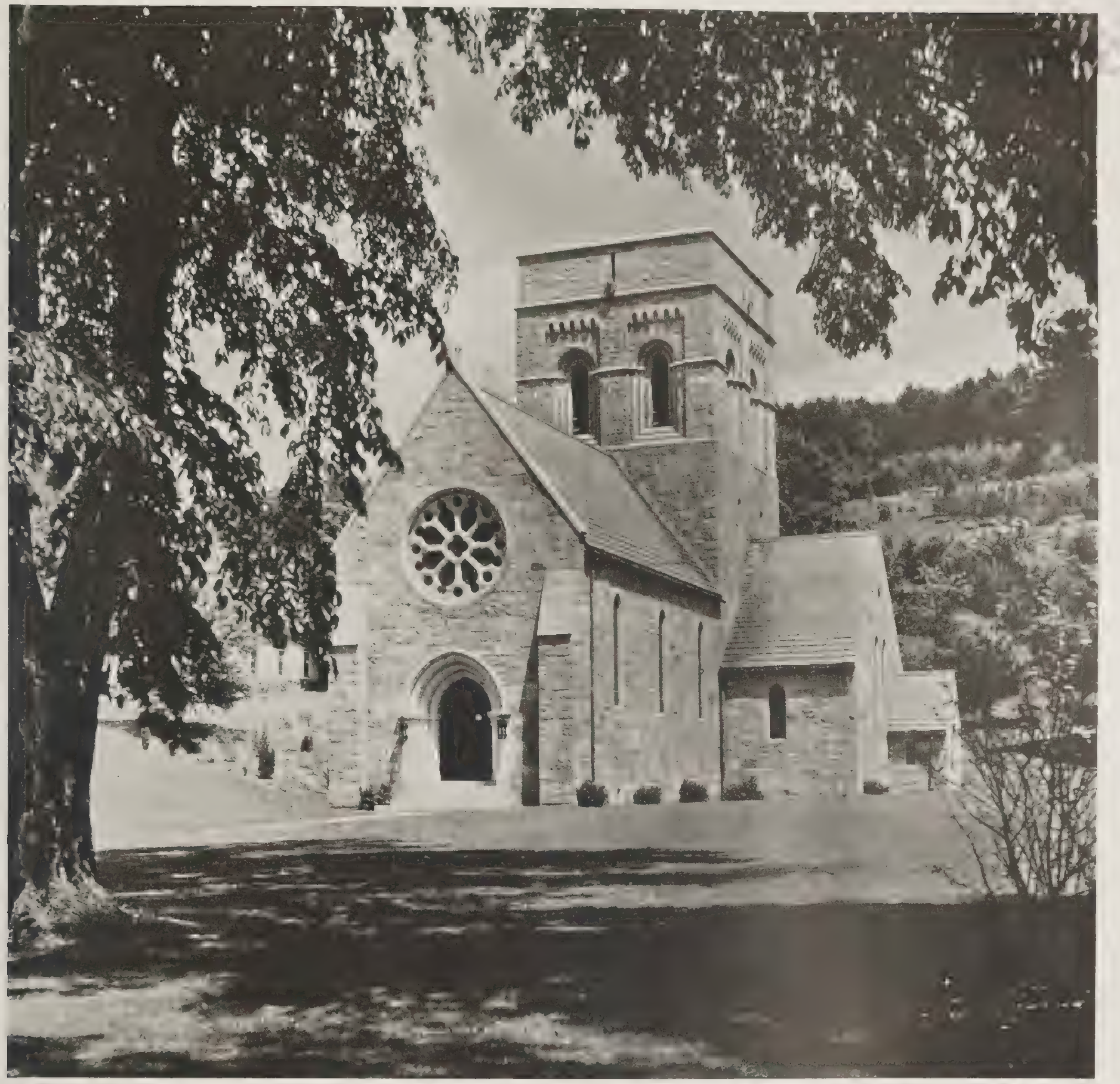


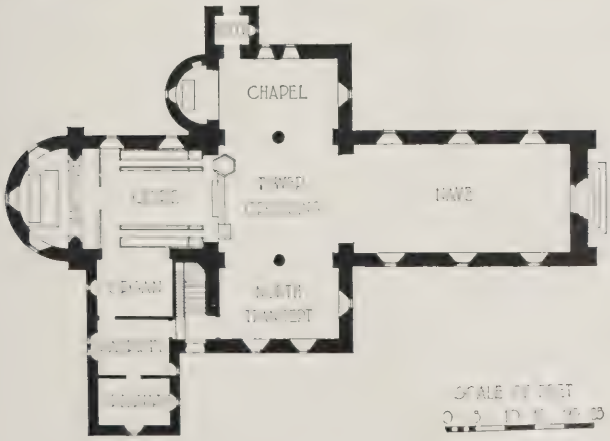
First Church of Christ, Scientist, Lakewood, O.
Charles D. Faulkner, Architect



Worshipers Close to Readers' Desk
Ample spaces for social uses

As to the question of the type of architecture particularly featured in Christian Science churches, its religious inheritance makes the use of Classic Roman with its variants Colonial, Georgian, etc., the preferred type, and this has, with few exceptions, been the rule since the erection of the extension in 1904. All symbols, with one exception, are eschewed entirely, but the limited use of quotations in lettering is approved. The classic severity of the generality of the church designs makes simplicity of decoration and coloring rather to be preferred to sumptuousness of carving and enrichment of moulding, and quiet dignity to multifarious interest.

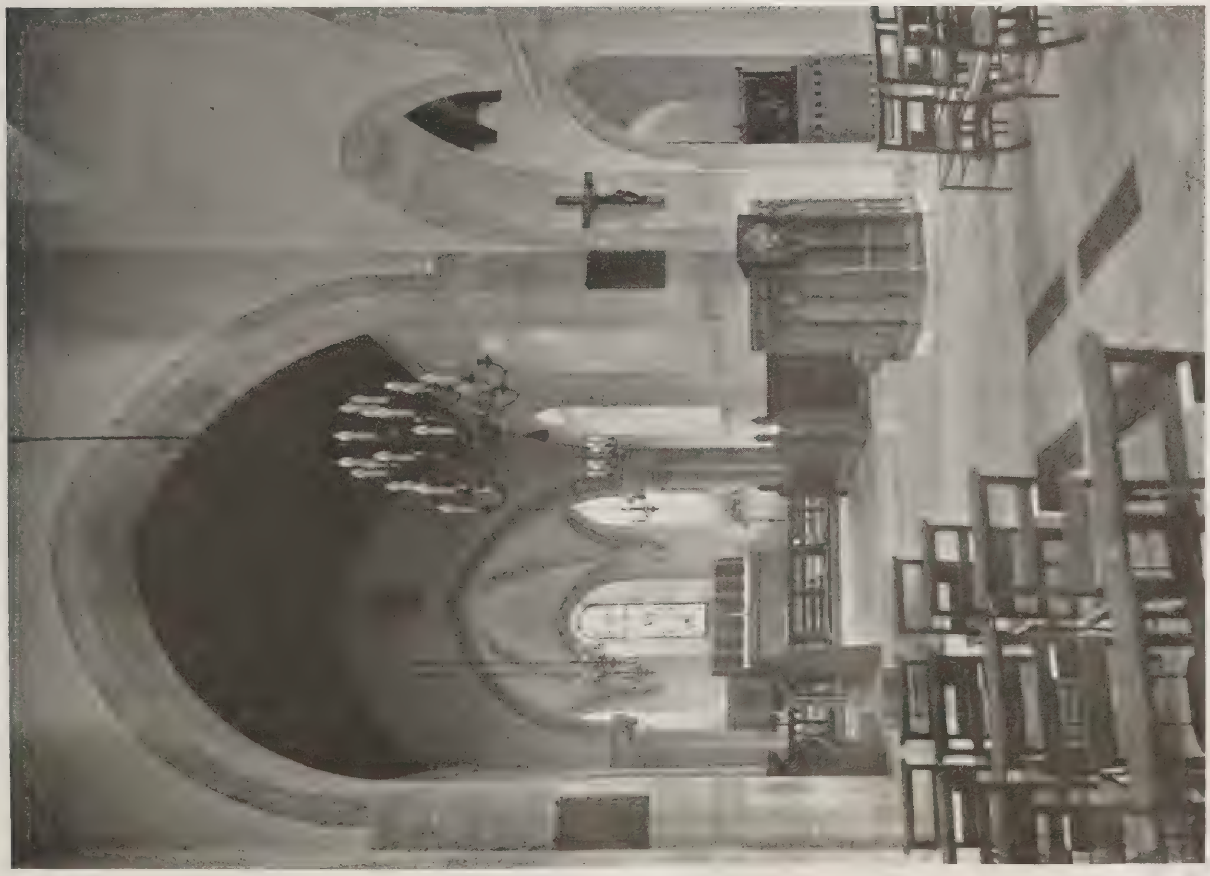




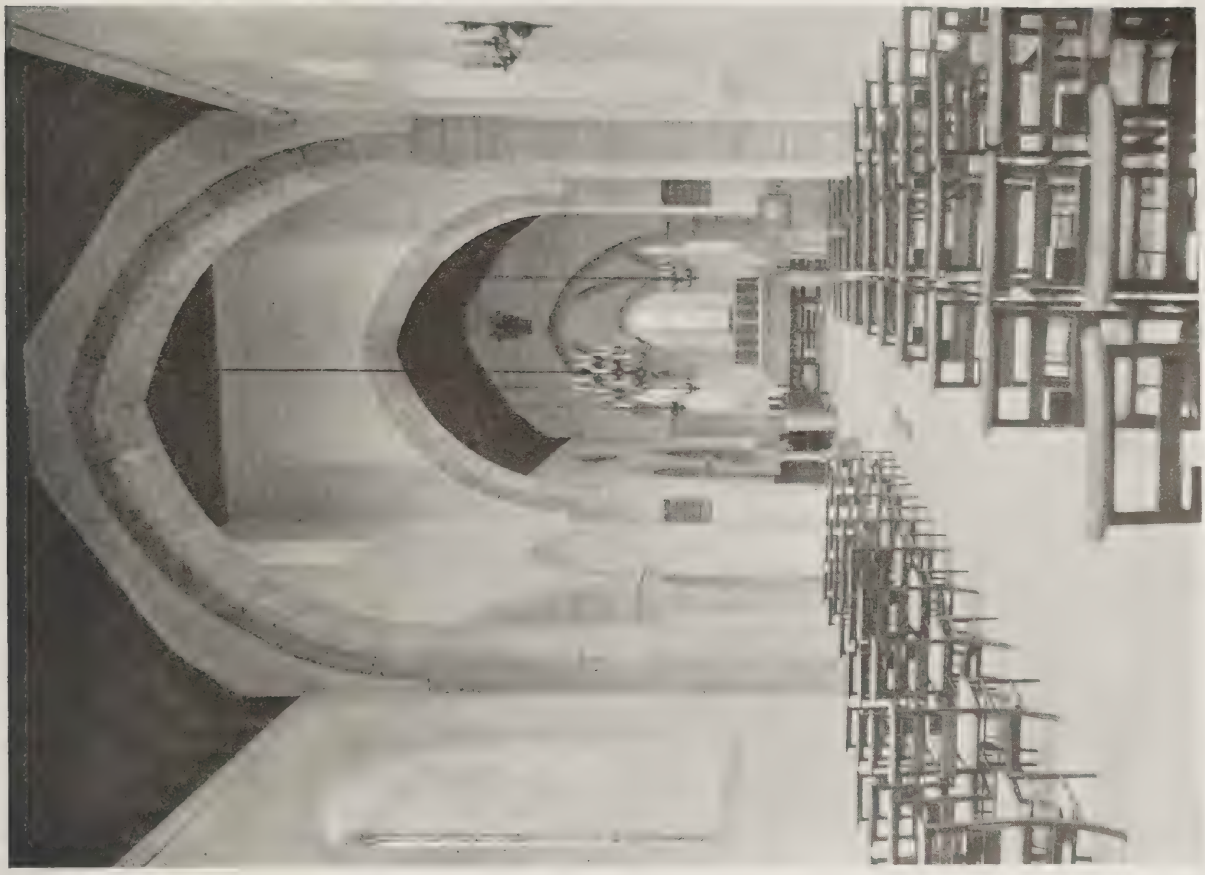
THIS rarely beautiful example of the small country church was made possible by the munificence of an individual donor who has provided in a crypt a mausoleum for the members of her family. The building, which stands in ample grounds of its own and suggests the wayside churches of Normandy or certain old country churches built in England during the Norman period, is of local granite with a square tower at the crossing, and the transepts which the cruciform plan has made possible are in effect chapels, that to the south having its own apse and altar.

Within the church the piers and the arches which carry the tower walls across the nave, transepts and choir, as well as certain arches elsewhere, are of granite, the walls themselves being plastered. Chairs are used instead of pews or benches for seating the congregation, and all oak woodwork is given the simplest of finish. While it has been built but a few years, the church has already become a treasure house of art in many forms, the result of the donor's interest and generosity.

ALL SAINTS' CHURCH, PETERBORO, N. H.
CRAM & FERGUSON, ARCHITECTS



CHOIR AND SANCTUARY FROM CROSSING

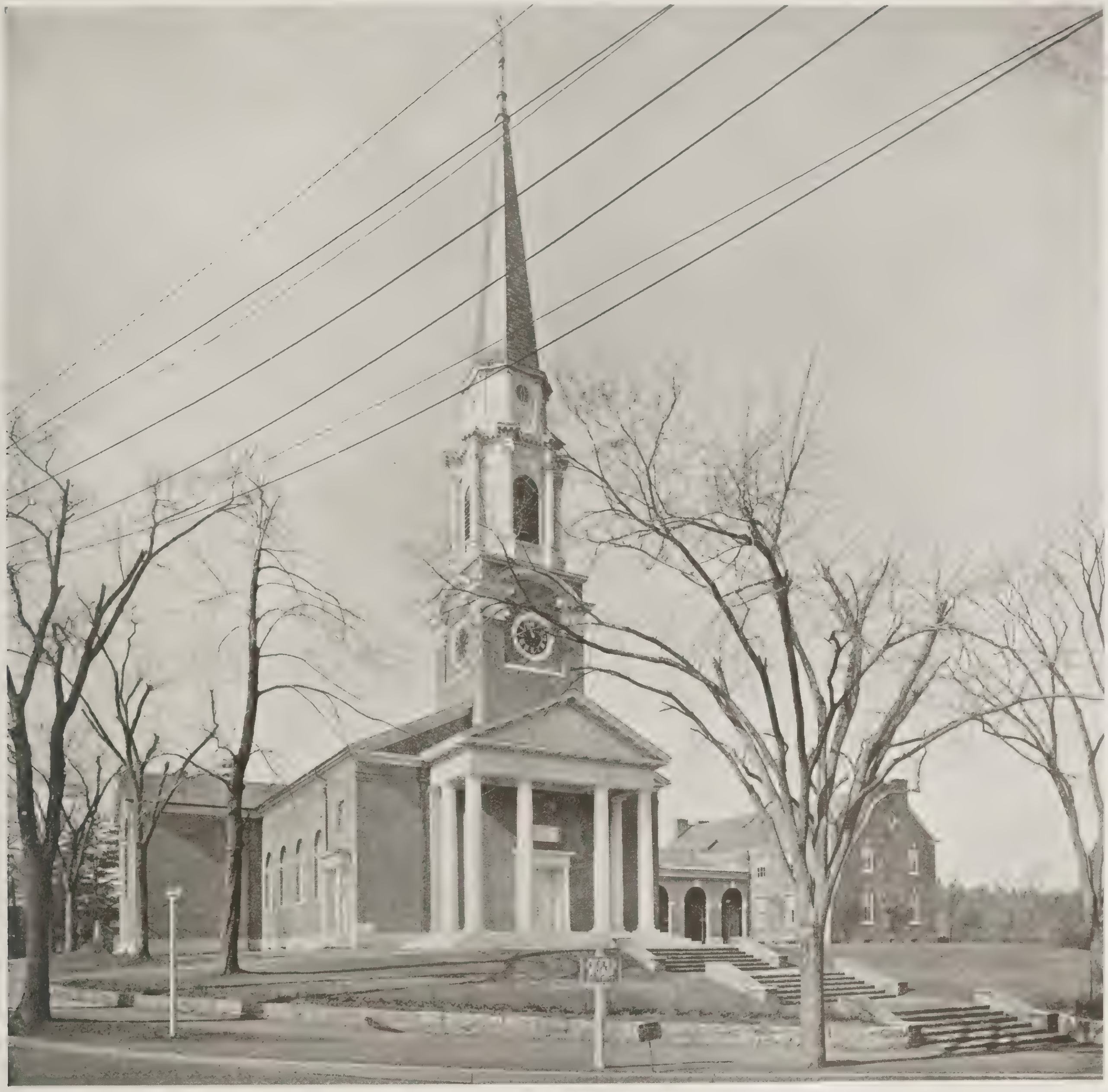


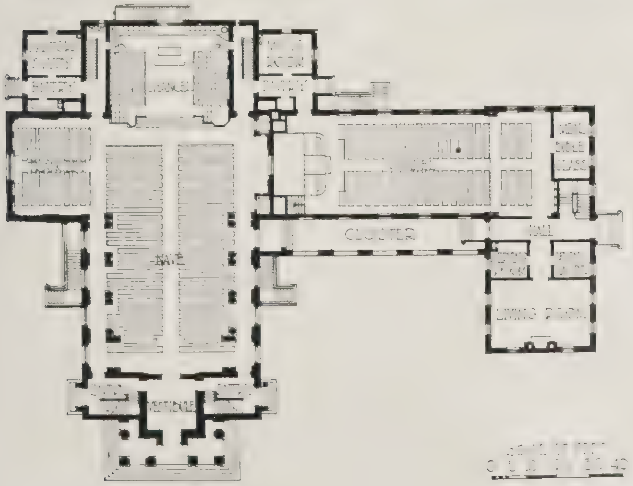
VIEW OF NAVE, CHOIR AND SANCTUARY

ALL SAINTS' CHURCH, PETERBORO, N. H.

CRAM & FERGUSON, ARCHITECTS

*Photos. Paul J. Weber*

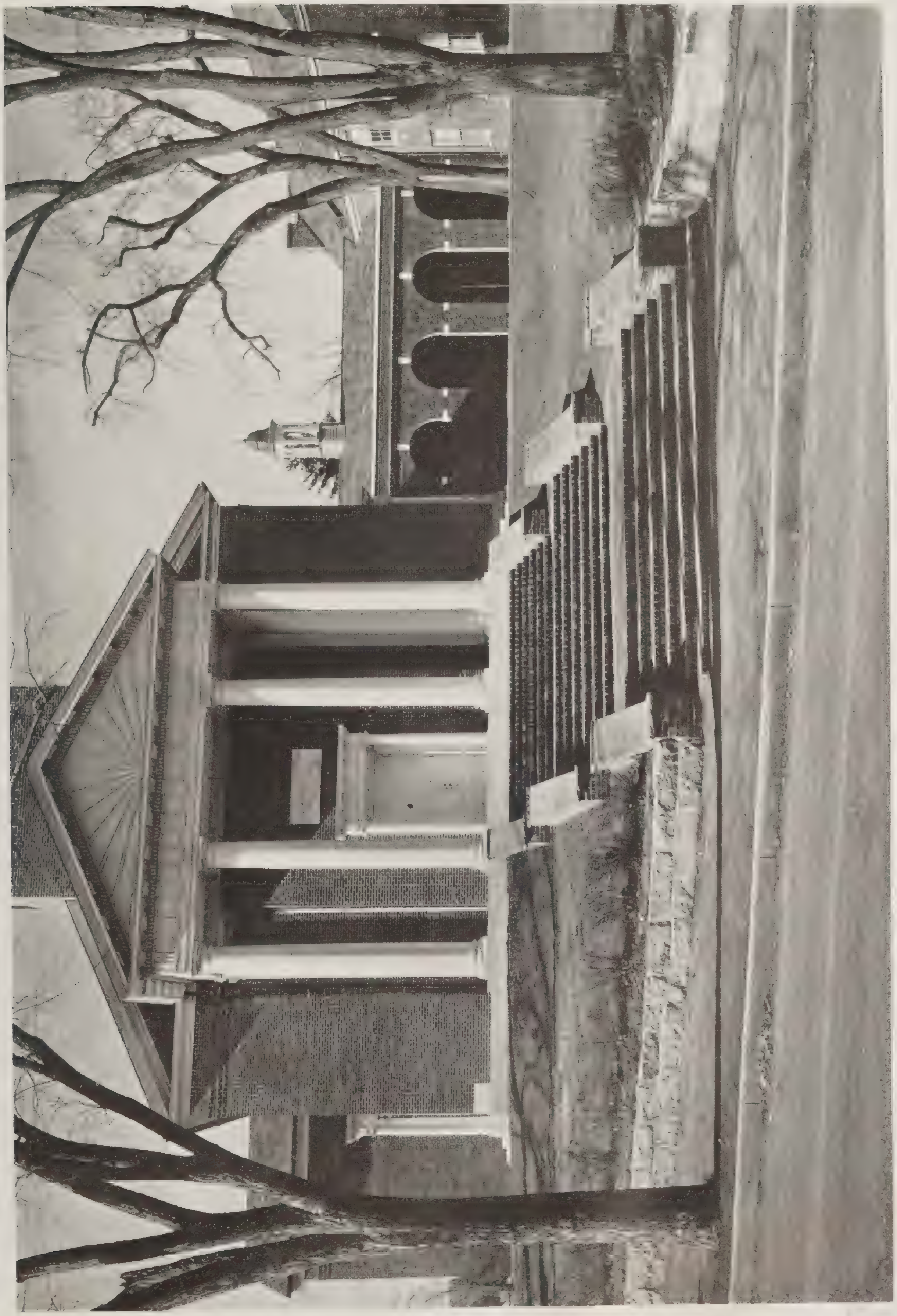




THE suitability of the "New England meeting-house" type of church building to the needs of a present-day congregation is well demonstrated here. While it possesses a distinctly ecclesiastical dignity and churchly character, it is at once apparent that the church is intended primarily to be an auditorium for preaching rather than a setting for a liturgical service. With this end in view the auditorium here has been so planned that no columns prevent any of the worshipers from seeing the pulpit and preacher. The organ and choir seats have been located close behind the pulpit which is always an aid in conducting services where much depends upon the personality of the minister and the quality of the choir.

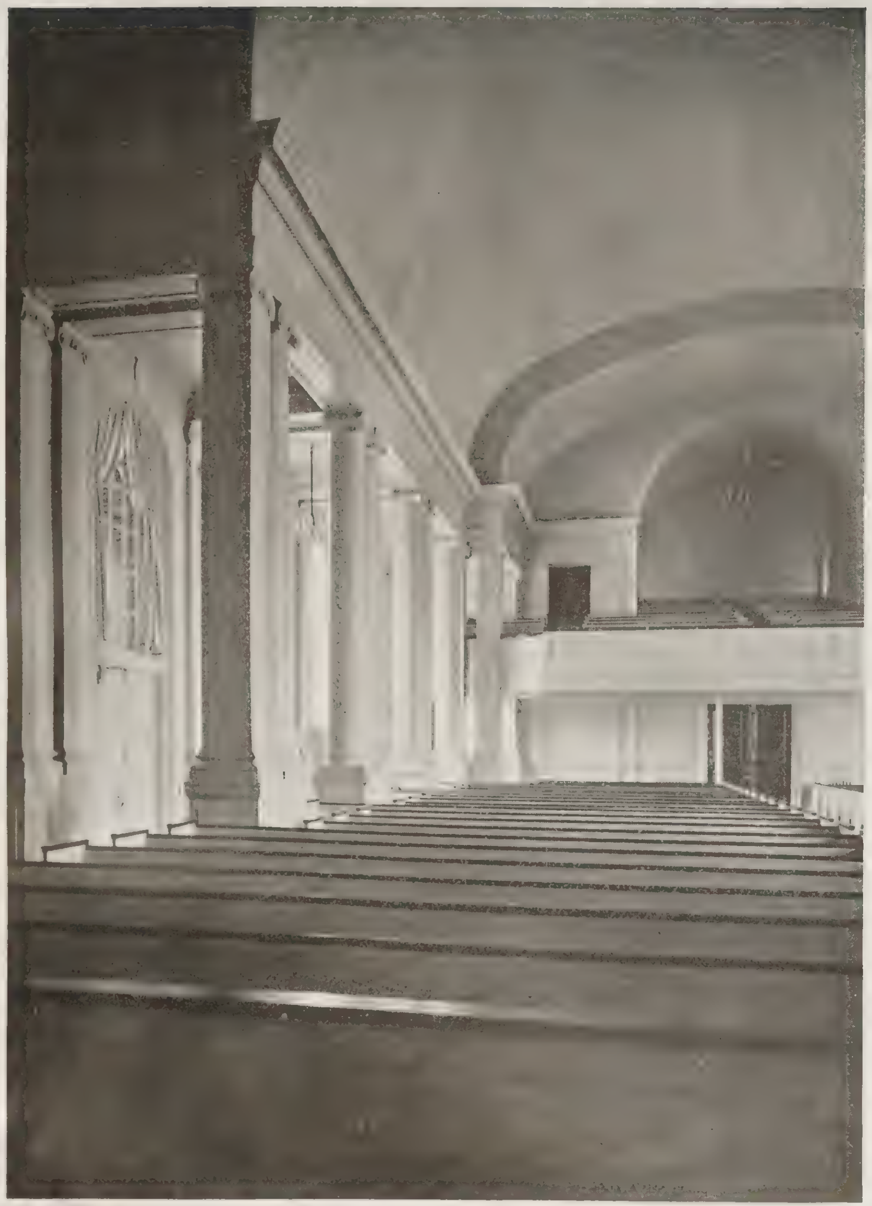
The exterior is rich in its restrained but graceful lines; the grouping of the various buildings is such as to enhance and emphasize the dignity of the church proper, and the materials, brick with stone sills and keystones, and wood trim, painted white, are those which, in addition to being the most appropriate for a building of this type, have the advantage of being comparatively inexpensive.

CONGREGATIONAL CHURCH, WELLESLEY, MASS.
CARRERE & HASTINGS, SHREVE & LAMB, ARCHITECTS

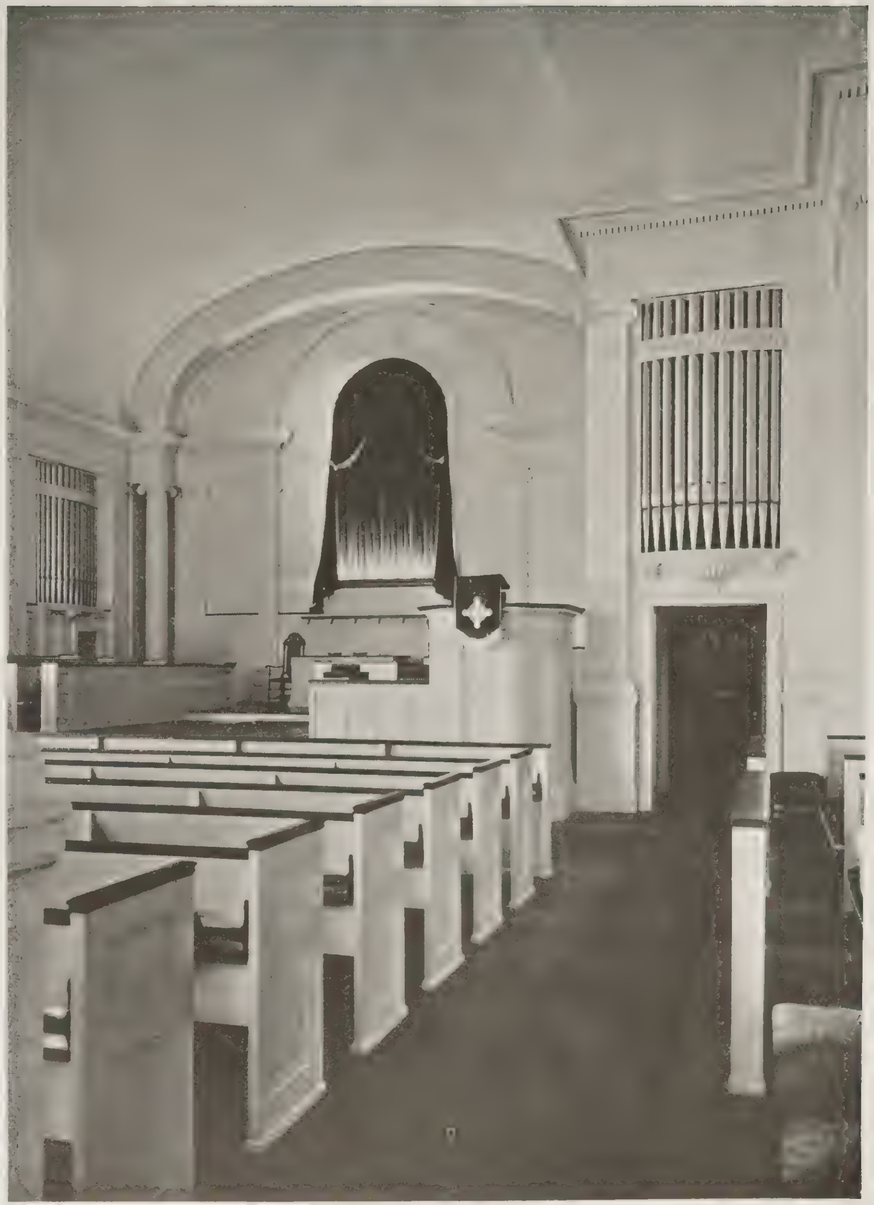


ENTRANCE PORTICO AND CLOISTER
CONGREGATIONAL CHURCH, WELLESLEY, MASS.
CARRERE & HASTINGS, SHREVE & LAMB, ARCHITECTS

Photos. Paul J. Weber

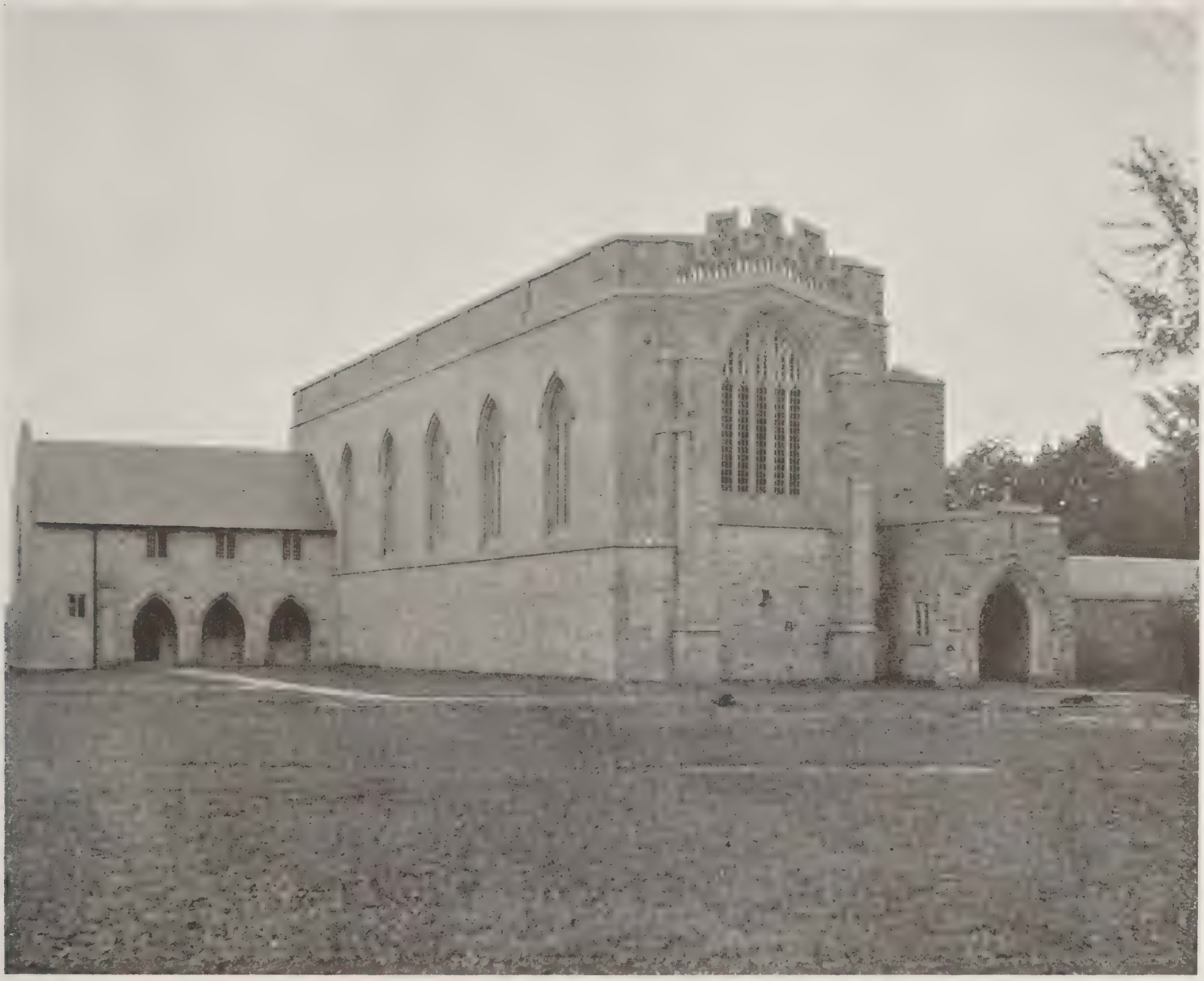


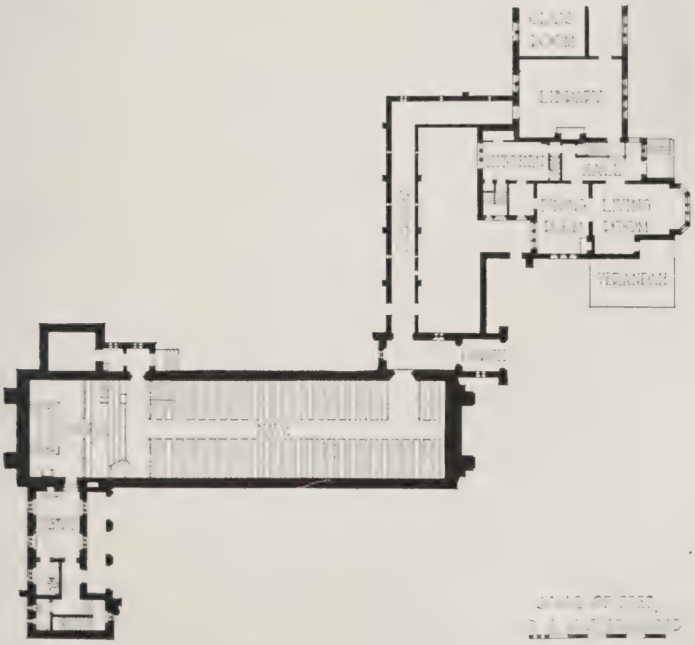
AUDITORIUM AS SEEN FROM CHOIR



INTERIOR, LOOKING TOWARD PULPIT

CONGREGATIONAL CHURCH, WELLESLEY, MASS.
CARRERE & HASTINGS, SHREVE & LAMB, ARCHITECTS

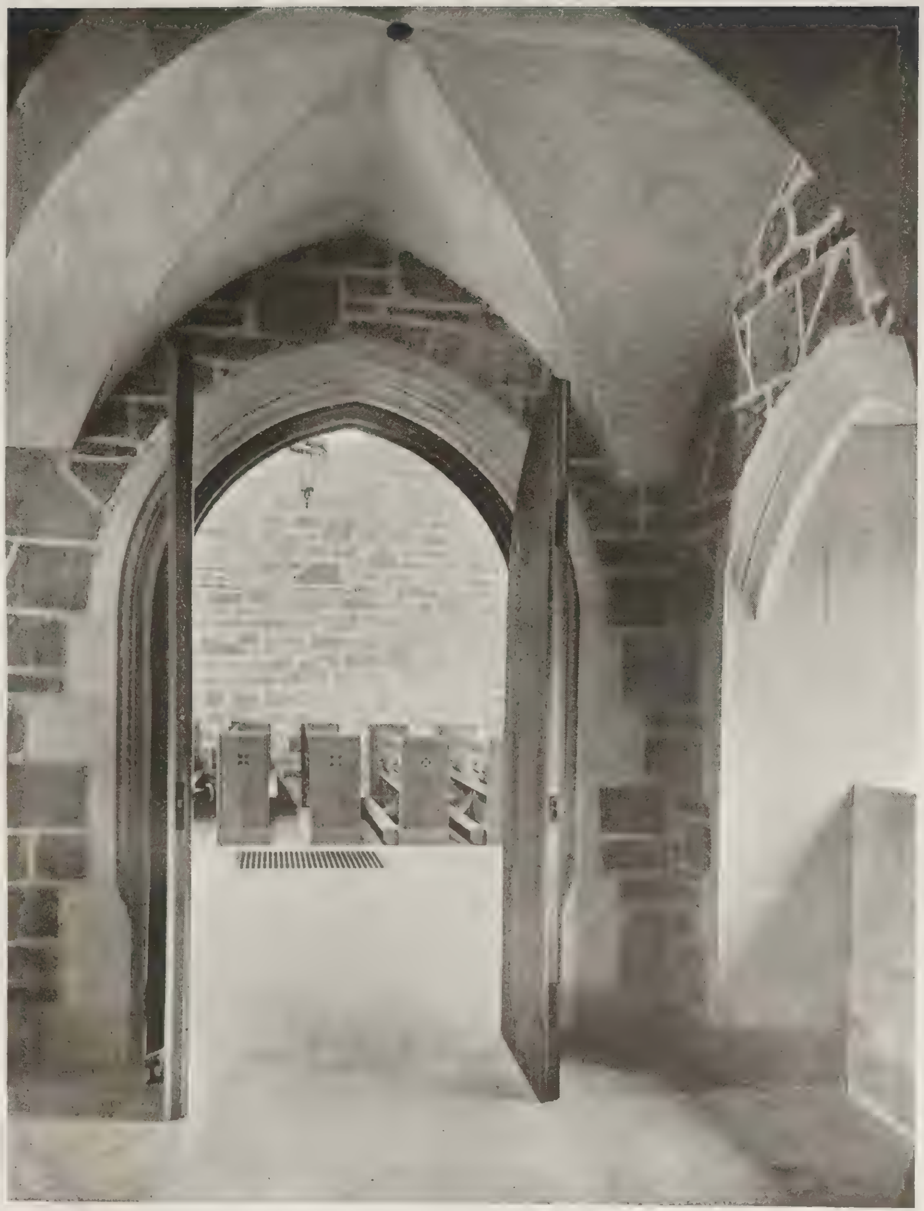




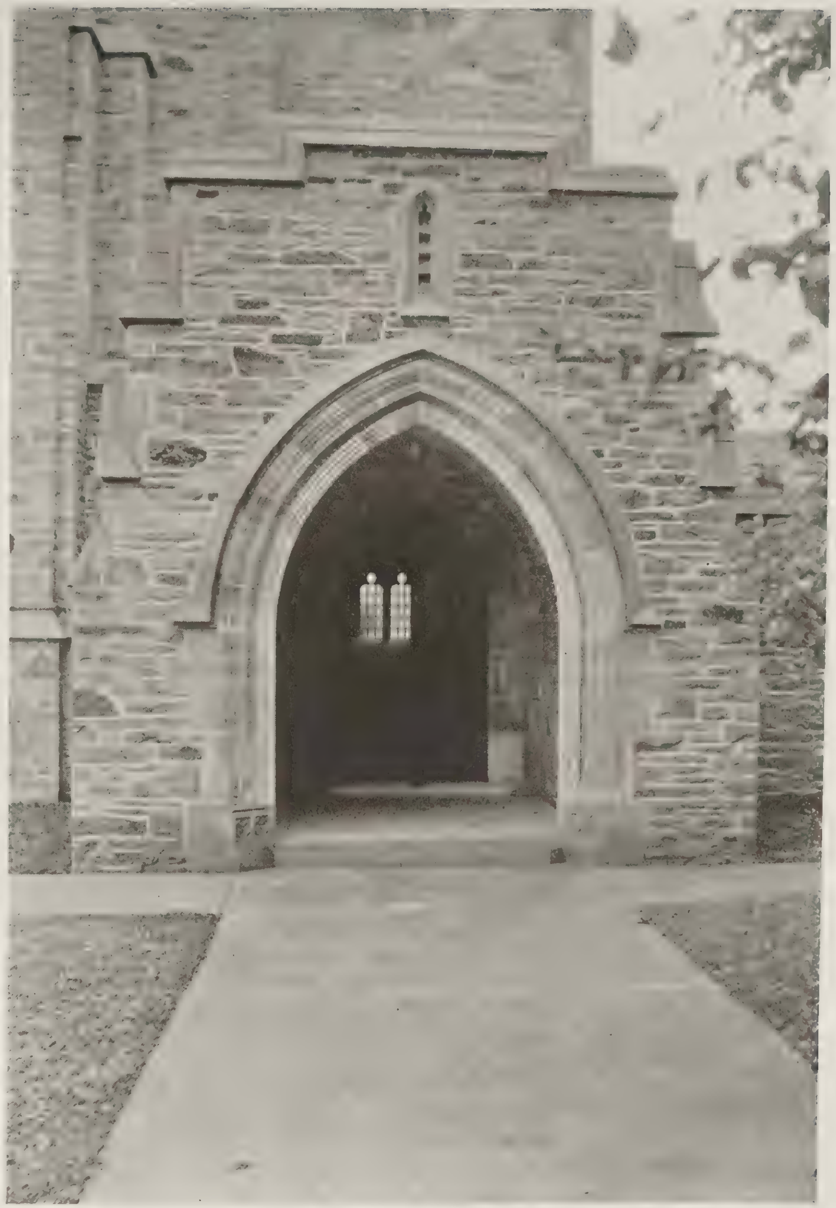
THE highly architectural dignity which characterizes this collegiate chapel group is due partly to its excellent design and the skillful placing of its different buildings, and partly to the use of materials which are appropriate for use in structures of this kind. Without and within the walls of the chapel are of a richly colored local stone laid up in ashlar, with cut stone used for jambs and sills of doors and windows, string courses and the tracery which fills various openings. Viewed from the entrance door by which the chapel is approached from the cloister the interior is impressive by reason of its length, its narrowness and its height, and by the placing of its windows high above the floor. The ceiling which is of heavy open timbers is supported upon corbels of stone. The roof timbers as well as the wood used for doors and for choir stalls, benches and other accessories are of oak with very little finish. The character of the entire interior with its stone walls and timbered roof is that of austere dignity, and it offers unusual opportunities for enrichment.

The various structures which compose this chapel group are admirably disposed in relation to the chapel proper which stands at the center, the long, low wing which contains the vestry and other departments being balanced upon the opposite side by the rectory and collegiate building which are joined to the chapel by the cloister.

MEMORIAL CHAPEL, BISHOP RIDLEY COLLEGE, ST. CATHERINE'S, ONT.
SPROATT & ROLPH, ARCHITECTS



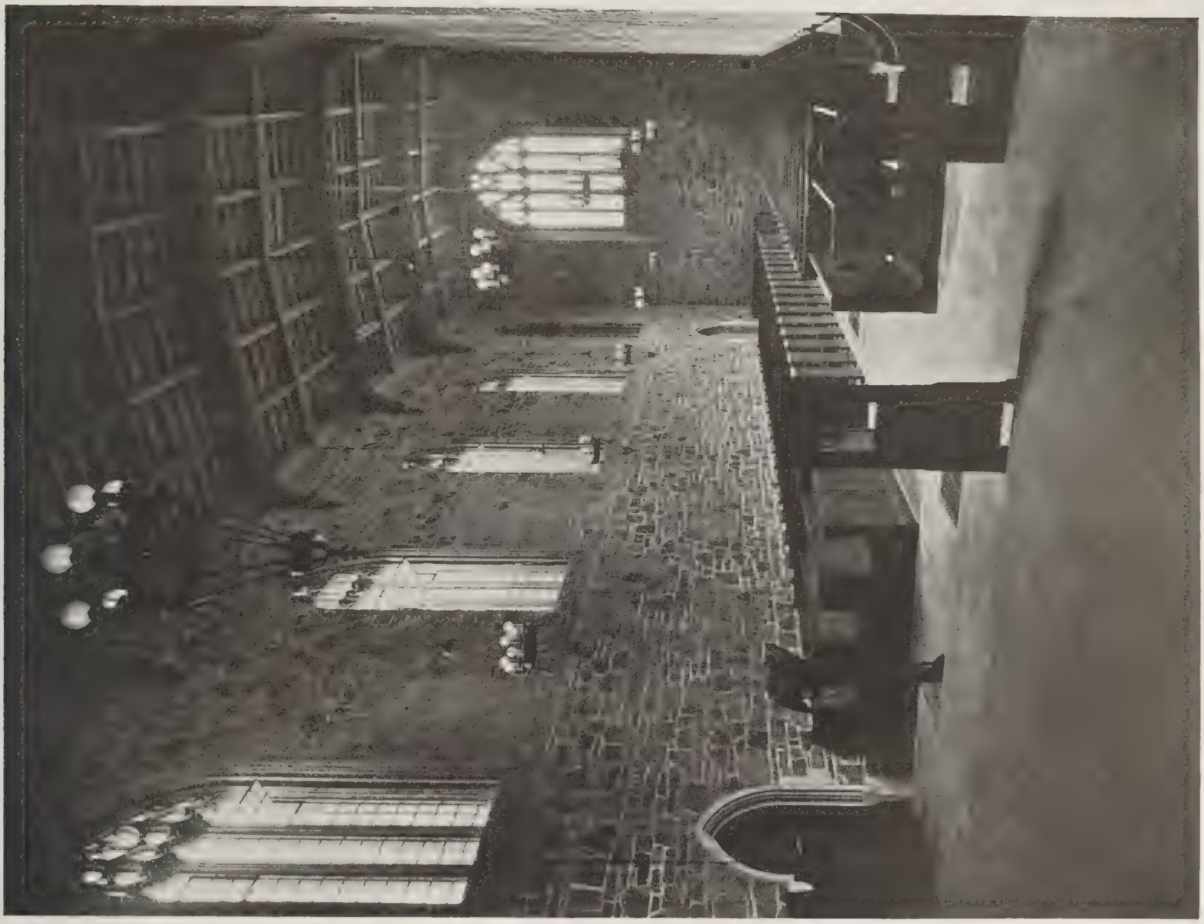
NAVE, SEEN FROM CLOISTER



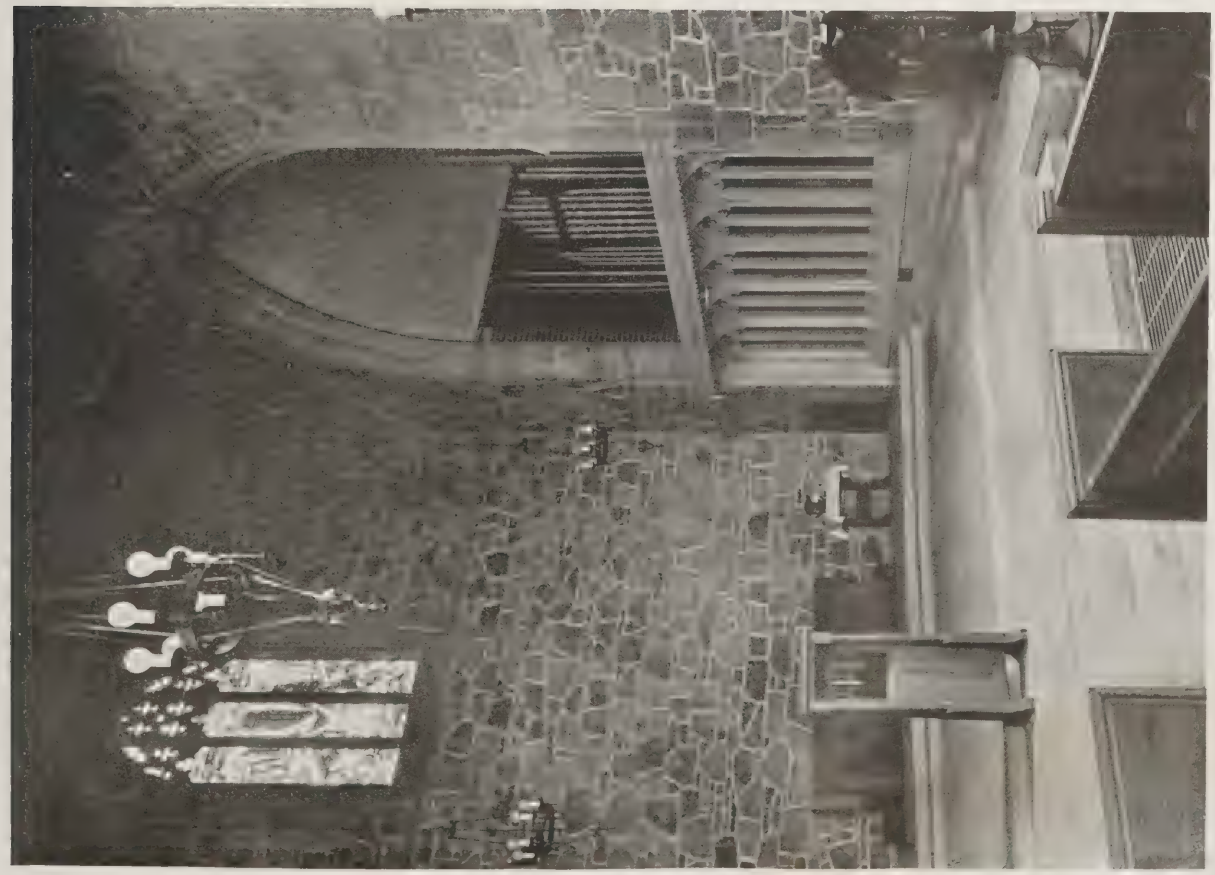
PORCH ENTRANCE TO CHAPEL

MEMORIAL CHAPEL, BISHOP RIDLEY COLLEGE, ST. CATHERINE'S, ONT.
SPROATT & ROLPH, ARCHITECTS

Photos, Paul J. Weber



VIEW OF INTERIOR, LOOKING WEST



EAST END, CHOIR AND CHANCEL

MEMORIAL CHAPEL, BISHOP RIDLEY COLLEGE, ST. CATHERINE'S, ONT.

SPROATT & ROLPH, ARCHITECTS

# The Small Church

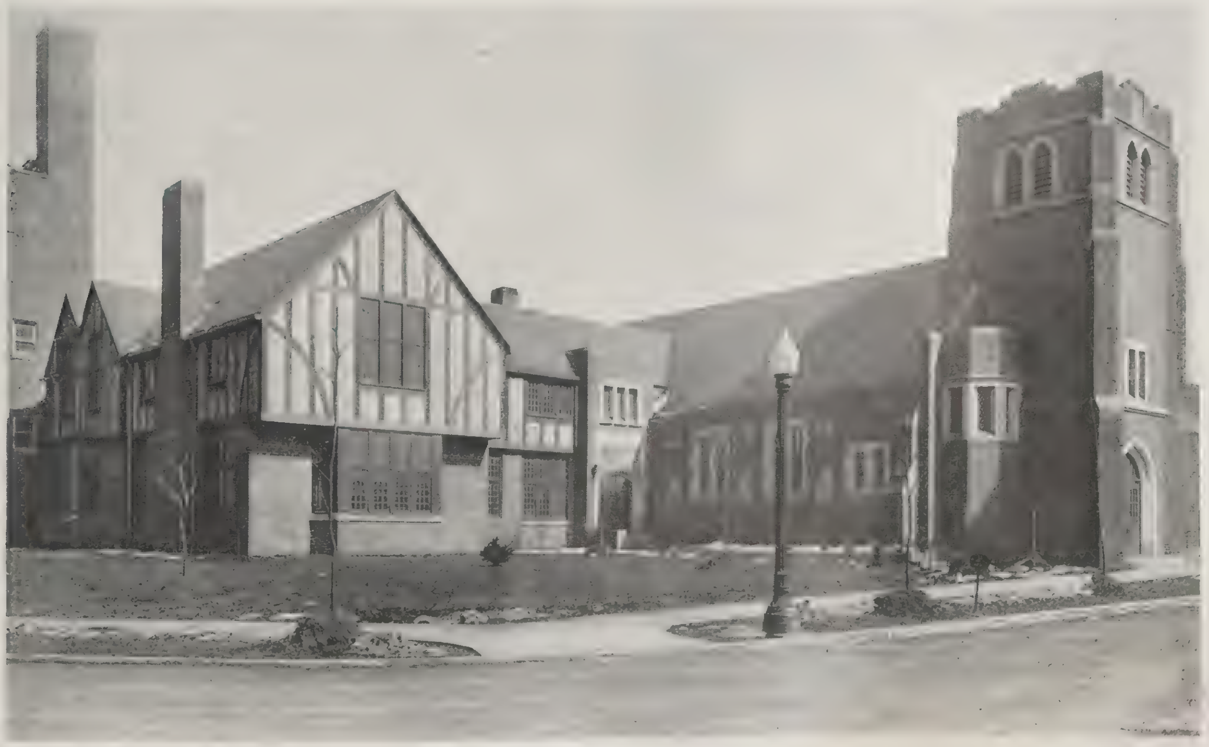
*By* ELMO CAMERON LOWE and FRANK G. DILLARD, *Architects*

QUITE naturally, the small church is a product of missionary activity. It might be well to say at the outset that such activity, for both urban and rural districts, is a subject of very intensive study by theological seminaries and denominational missionary boards. This study is bearing fruit in development of outlook in many regards. Even in villages and isolated rural sections, the church is becoming more and more a factor in community life. Its program is being extended to include the full cycle of interests of both young and old; its contact with human life is constant—week days as well as Sunday.

This attention to the small church problem has resulted in much conscientious investigation along the lines of housing and equipment, and many useful articles have been written within the past few years on this phase of the subject. A series of articles by E. Donald Robb, which appeared in the *Brickbuilder* for October and November, 1914, is highly inspirational.

There is no reason for the small church building, no matter how simple and inexpensive, to be built in poor taste or, as is so often the case, in positive violation of principles of proportion and common sense construction. The small church should be, first of all, *modest.* It surely must be the prayer of all lovers of order and propriety that we may soon see the passing of the small church that apes the more elaborate and costly structure. As Mr. Robb says, "We are all too familiar with the cheap and tawdry structures that masqueraded as churches during the period of artistic depression over which we have just passed, with their foolish wooden buttresses, pinnacles, galvanized iron crockets and contemptible ornaments of all kinds." After a rather expensive experience with the "common or garden variety" of present-day church builders, the writers are forced to the pessimistic and somewhat divergent view from that of Mr. Robb, that we have not yet entirely emerged from the "period of artistic depression." There are, however, indications that an increasing interest is being aroused within all communions on the subject of improving the standards of church building.

While the small church should be modest, it must not be cheap and flimsy. It must be purely functional in design, depending for its beauty on correct proportions, proper use of materials and effective ornamentation. Dignity should be the fundamental character of church design, and by careful attention to the factors just mentioned the small church building may be as dignified as the most noble cathedral. Because of the fact that they depend so largely on proportions, materials and restraint for their attractiveness, it is the opinion of the writers that the English village churches furnish the most suitable basis upon which to work. How divergent are the



First M. E. Church, Whiting, Ind.
Lowe & Bollenbacher, Architects

Auditorium, First M. E. Church, Whiting, Ind.
Lowe & Bollenbacher, Architects

examples of buildings falling within this classification; wonderfully fascinating little churches that accommodate but a handful of worshipers, and other churches of all degrees of size and fineness to structures that would please the richest congregations! In all of them, the chief charm is an honest and frank expression of construction and material. No shams—no covering up of "claptrap" construction anywhere. The village churches in some parts of continental Europe offer splendid examples for study; some especially attractive plastered buildings are to be found in Denmark. Wherever found, these structures are founded upon the same basic principles that make the small English churches so suitable for our inspiration.

Georgian and American Colonial types are very satisfactory, and in some sections may be more appropriate than the English. However, the tendency is so great in church buildings following these styles (judging from observation) to introduce cheap metal cornices and ornamentation, poorly designed stock columns and mouldings, and atrocities of belfries, that it seems almost unsafe to recommend them. The cost of upkeep of frame buildings is so high today that a great many congregations allow their buildings to fall into the sad state of deterioration so common throughout the country in this period of high costs.

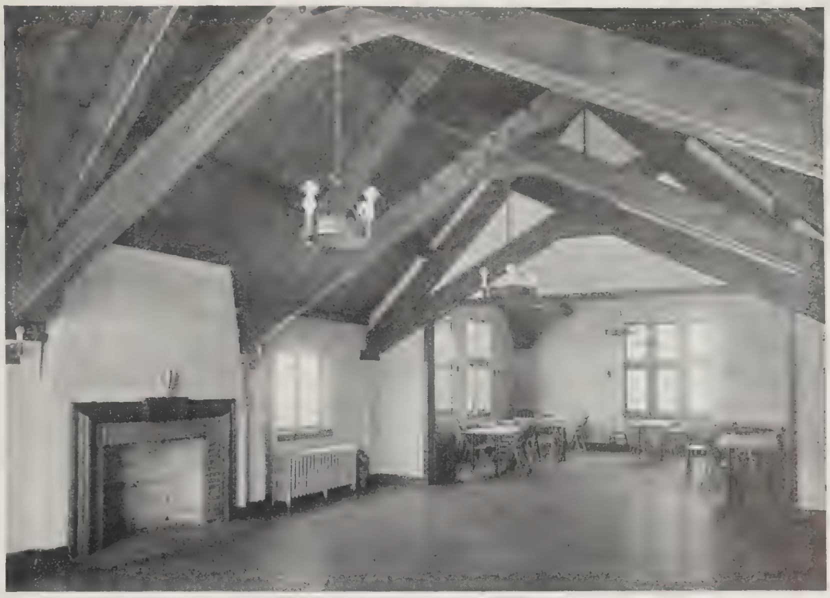
There has been a tendency toward the Classical or "library" type of church building, especially in the middle west. All that has been said, regarding both cheapness of material and insincerity of construction in pseudo-Colonial churches, usually applies with double force to this much abused type of small church building. There is the added objection to the flat roofed, box-like structures of this classification that they do not look like churches,—they create no impression of religious character in the mind of the average beholder.

There have been a number of small churches built of brick with very little stone trimming, that by the simple means of well proportioned openings, lowness of walls and steepness of roofs, are exceptionally attractive even though inexpensive. It is superfluous, in the face of what has been said regarding honest design, to introduce a word of condemnation of brick veneer construction, and our readers would not be offended by mention of it were it not that so many pastors and building committees have been misled into countenancing such construction by builders who have no regard for the principles that should always govern church building.

The practice of unintelligent copying is largely responsible for the terrible examples of church building to be seen on every hand. It is quite often due to a combination of incompetence on the part of the designer with ignorance on the part of the building committee. Church buildings above all other structures should be individual. Obviously this cannot be obtained by copying from some church that may have been seen by the committee in the adjoining village and to which they have taken a deep and unalterable fancy. The only course for a conscientious architect to take in such a case is to decline the commission, if his efforts at education are fruitless. The reason it may be safely assumed that such selection by the church leaders is poor is that at present (especially in the west and middle west) poor examples are sadly predominant. If our church buildings could be designed in the devoted spirit of English Gothic—even if not in detail—and if church building committees were wise enough to employ only such architects as really experience this spirit, we should within a short time see an improvement in church building.

In connection with church work, the intelligent architect has an opportunity—one might almost say obligation—of exercising his highest calling, that of developing an appreciation of the beautiful. Mr. Robb, in the article already referred to, sets a high aim for architects in this most appropriate way: "As art is the reflection of spiritual conditions, we cannot hope to properly establish a study of religious art without first producing those conditions which nourish and encourage its growth. . . . Art is one of the most potent factors at the command of the Church, and did she but know it, one of the strongest agencies in freeing the people from that spirit of commercialism and materialism which is her worst enemy at the present time."

The architect must fully understand the function



Sunday School Room, First M. E. Church, Whiting, Ind.
Lowe & Bollenbacher, Architects

of the church, and in full sympathy lead the congregation to paths of high aspiration. Ralph Adams Cram, in his "Church Building," tells us something of the devotional spirit that should actuate the church builder. Could anyone, after reading such an inspiring thesis, resort to cheap substitutes for permanency? On account of the very pressing need for economy in small church building, the most durable local building material should be selected, and the design of the structure largely developed from that starting point. When it can be secured reasonably in cost, stone is the most desirable material for walls. Frequently, in cases where the cost of stone seems prohibitive, an investigation of conditions will reveal possibilities for securing it at a cost within reach. An important church building was recently constructed with walls of beautiful ledge stone scrap from a distant slate mine, the cost of which was only the freight charges. In very small church buildings, the side walls can be kept quite low; a stone wall even to sill height with stuccoed tile above it can be made very effective.

Kiln-run red brick laid in uncolored mortar is the next choice for walls. Plain segmental or pointed segmental arches are effective in brick walls, and double reveals are sometimes advisable, especially where vertical lines should be emphasized. Gray slag brick is quite inexpensive in some sections and can be used quite effectively in certain types of buildings. Many recent small church buildings have been built with stucco finish over tile, concrete block and even wood frame. The use of stucco requires especially careful attention to the relation between wall surfaces and openings and to the texture of the finish.

No dependence should be placed upon applied ornamentation in small churches unless it be to use at some effective point a bit of stone carving that is of real artistic value. It has already been suggested that art in the small church must be expressed by structural integrity and good proportion. However, if the funds will permit it, a concentration of richness will be of great value—much more than tawdry, cheap ornamental details scattered about with a free hand. One important window, with well executed stone tracery, and all others in plain brick openings with brick sills is better than to have all of the windows in the customary more or less elaborate and expensive wood frames that pretend to imitate tracery. It is a form of hollow mockery.

Considerable study should be given to fenestration. A common fault of the kind of church buildings that are produced in wholesale lots is an absolute lack of scale between openings and wall surfaces. Almost always the windows are too large, and they are quite sure to be beautified (?) by the ugly wood frames already mentioned. There are now on the market several makes of steel casements that should be a boon to the designer of small, inexpensive churches. Single units are about 20 inches wide, which is as wide as single windows should be for the type of building we have in mind. These frames can be had without muntins if leaded glass is desired. In some types of building the standard size of panes will be in good scale. Sills should be at least 4 feet above the floor line. If the glass is to be leaded, a thoughtful architect will insist on the absolute simplicity of diamond or oblong quarries of delicately tinted cathedral glass, no matter how loudly the congregation may clamor for "art glass."

As just suggested regarding tracery, one especially prominent window of well designed glass will be very effective if it can be afforded. If steel windows with standard muntins are used, figured glass or light amber cathedral glass will be satisfactory in most types of small church buildings. All Sunday School and social rooms should have windows glazed with clear glass. Especially designed doors with suitably wrought iron hardware should be provided for the entrances.

The roof of the small church is an important feature. In the first place, it should be perfectly plain in construction and designed for its fundamental function of discharging rain and snow as effectively as possible. A pitch of about 50°, or somewhat steeper, will be found to be of value both for appearance and construction. Steep roofs are especially good if the building is without a basement and the walls consequently low. A roof that is thus made so important a part of the building should be covered with a good quality of slate of graduated or staggered thicknesses and variegated colors to insure good texture. This is an expense that will justify much economy elsewhere in the building.

Restraint should be exercised in designing the interior of the building as well as the outside, and the general principles suggested here should prevail throughout. Whatever elaboration of detail can be afforded should be centered in the chancel. Church floors should be sanitary, solid and noiseless. It is always desirable, from the standpoints of exterior appearance and accessibility, to have the auditorium floor only slightly above grade. When this is possible, the sub-floor can be of concrete laid on fill. For floors of this kind, slates, flagstones or tile are good materials for the aisles, and the spaces under the pews can be cement finished. Composition flooring, battleship linoleum or cork carpet over concrete or wood base will be satisfactory for more economical construction. Flooring in the chancel should be of better material than elsewhere in the building. Dark colors should be used pretty generally throughout. If the building has a narthex, it will be well to enrich its floors somewhat beyond that of the main floor of the church proper, possibly by using the material that is used for the aisles. All Sunday School and social rooms should have wood floors, stained dark and finished in harmony with the general character of the building.

Open construction of roofs is most desirable. It gives height to the interior and also truthfully shows construction. Very often the church committeemen will fear the use of exposed trusses because they may be aware of the high cost of casing the steel trusses of a church in some neighboring town; but it should be pointed out to them that solid wood trusses, in which the rough timbers are exposed and stained, can be built for as little outlay as would be required for casing all the members of complicated steel trusses. For the small church with a roof span of 25 or 30 feet, solid wooden trusses are very suitable. The plain "scissors" truss (especially for steep pitches) is comparatively inexpensive. Its members can be either solid beams joined carefully or built up of 2-inch boards with finishing boards over the under surfaces to conceal joints. There are for the small church builder many possibilities in the field of wood truss construction. We have seen some examples of wood and rod trusses that are quite pleasing and not very costly to construct. In trusses of this character, the usual long, level, lower chords can be relieved by bolsters and brackets. In some of the best recent types of small rural church building, the ceiling is plastered on scissors trussed rafters with collar beams and knee braces arranged so that the faces of the ceiling with the side walls form, in section, half of an irregular dodecagon, side windows penetrating the lowest sloping surfaces.

In buildings such as we have under consideration, and even in larger churches, side walls can be very simple indeed. Lime plaster is best for acoustics. We would suggest that jambs and heads of window openings be plastered with the surfaces splayed. By this method considerable expense can be avoided on account of the omission of the wood trim. In some types of rooms for worship a wood wainscot to the height of the sills will be very satisfactory. Such wainscoting may be made of matched and "V" jointed boards of uniform or alternating widths, stained a dark weathered wood color.

If any enrichment can be afforded in painted ornamentation, it should be confined to the chancel. Wall decoration in most small churches will necessarily be plain, and unless such enrichments can be of high artistic quality they should be confined to modest stenciled borders or omitted entirely. A rich border, introducing bright colors, can properly be carried around the chancel arch. Bright colors can also be used with great effect on roof members, but such treatment should be carefully studied.

The simple oblong room, which was considered to be the best plan for the little Gothic churches of England, has never been improved upon. Today our most successful small churches are of this type of plan. A great advantage is gained in the simple dignity and also in reduced cost. What a contrast in repose there is between a church of this kind and the very common type in which the interior is square, with pulpit in one corner, entrance in the opposite corner and the sides full of barbaric windows of gigantic scale, penetrating the sloping ceiling in all kinds of disorderly intersections!

If there is to be provision for emergency seating space, this can be taken care of by a small gallery over the narthex, and perhaps transepts, one of which can be shallow and used for the choir, the other larger to serve, in addition to seating space, for a prayer meeting room or chapel. If the church can afford to build an aisle on one side, this space can also be used for extra chair seats. The Sunday School and social needs of the church and community must be provided for in a closely related annex,—preferably a wing. The actual cost and prospective needs along these lines should be carefully considered in the light of modern religious educational programs.

The reader will have noted before this that we have endeavored herein to reduce this proposition of church building to the financial ability of poor congregations, presumably of non-liturgical denominations; there are so many of them throughout the land, and they deserve better treatment than is usually accorded them, even though it may at first be hard to get them to accept the treatment. Architects of ability should help such congregations to do right in building, even if it means sacrificing regular fees. This is not advocacy of doing church work for nothing (the architect must be his own judge in that regard); it is rather an attempt to stimulate an effort toward correcting the common practice of poor churches, that is of building from drawings made with no thought of the fitness of things.

# Sunday School Requirements

*By* HENRY EDWARD TRALLE

CHURCH architects today are confronted, at the very threshold of their planning, with an educational and an ecclesiastical problem.

*Church House and Schoolhouse.* A church house today implies also a schoolhouse, and a schoolhouse in connection with a church house must mean exactly what schoolhouse means anywhere else—a building adapted to educational uses. This schoolhouse, therefore, must be a building complete in itself, and must be used only for distinctively educational purposes. It cannot be a mere space in a church auditorium, or a mere enlargement of such an auditorium with a movable partition on the side toward the pulpit for partial separation. Nor can it be a basement room that is used also for social purposes. To put a Sunday school or any part of it into a basement room is an abasement of religious education. Nobody would think of putting any other kind of school into a basement, and why should the Sunday school, of all schools, be thus mistreated?

The church, of course, should have a recreation room, but even this room should not be in a basement, and, wherever it is located, it cannot be effectively adapted to educational uses. This recreation room can be used for social functions, entertainments, games, and even as a dining room, but not as an educational room.

The church school is developing an educational consciousness, and is realizing as never before that a school, whether it be called Sunday school, Sabbath school, Bible school, or church school, implies a schoolhouse and school equipment. The Sunday school at the beginning was allowed to come into the church on sufferance, and to occupy a corner of the church auditorium. Then, as it grew, a room was built for it on one side of the church auditorium, with a movable partition between, so it could be used also as an enlargement of the auditorium on occasion. This added space was not a good room for a school, and it had the same effect upon the appearance of the auditorium that a good-sized wart would have on the side of a woman's face—but it got the Sunday school off the carpet in the auditorium, and saved the sanctity of the sanctuary!

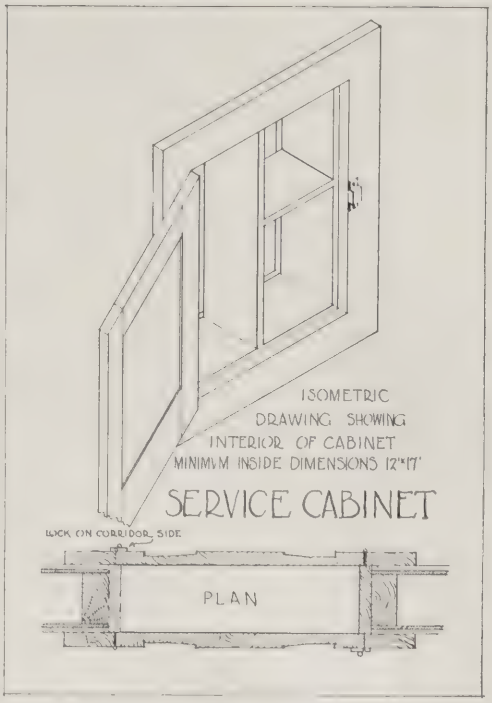
The next step in building for the Sunday school was the placing of irregularly shaped classrooms around two or three sides of this added room, each room separated from the other rooms only by thin movable partitions, open in front, or else with curtains. Sometimes this added Sunday school room was semi-circular in form, with two tiers of partial rooms or stalls around the semi-circle, one above the other, and a high ceiling for the rest of the large room. This two-deck "side-wheeler" was designed for the old fashioned one-lesson, one-assembly Sunday school, and belongs now to the educational museum, since the Sunday school has developed into a departmental, graded institution, demanding for itself a complete schoolhouse, with assembly rooms and classrooms.

*Spaces and Proportions.* This schoolhouse needs to be large enough to care for the school of the church in departments and classes, allowing 15 square feet of floor space per individual pupil. A school with 600 pupils, for example, will require 9,000 square feet of floor area for assembly room and classroom uses. An allowance of 16 square feet of floor space per individual pupil is liberal, and is considered by some to be preferable, while, on the other hand, an allowance of only 14 square feet of floor space per individual makes good educational work possible. These statements regarding floor space requirements are made on the basis of many measurements and observations and comparisons, and may therefore be accepted as a working basis in planning the schoolhouse of the church. Additional spaces, of course, must be provided for corridors, stairways, toilets, offices, etc., as these are not included in the provision of 15 square feet of floor space per individual, though the 15 square feet may include the spaces occupied by partitions between rooms.

In general, it may be said that the average church will need to provide, in its schoolhouse, for approximately the same number of individuals that its church auditorium will seat, and since about double the floor space per individual is required in the schoolhouse as is required in the auditorium, this means that about the same amount of ground area is required for the schoolhouse as is used for the auditorium, inasmuch as the schoolhouse is usually a two-story building, though it may be only one story high where there is an abundance of ground space, and it may be even seven stories where ground space is limited, provided elevator facilities are afforded.

This general statement regarding the total of ground space and floor space required for the educational work of the church presupposes that the church auditorium will be also the general assembly room for the Sunday school for its occasional meeting as a whole or, less preferably, that the recreation room will be used for this purpose, as it is considered that the occasional assembly of the whole Sunday school in the church auditorium is in itself good religious education, aside from the material saving in construction costs. When a church erects a second auditorium large enough to accommodate its school as a whole, "the Sunday school room," it is duplicating in effect what it already has in its church auditorium, and this cannot often be done.

The total floor space in the schoolhouse of the church should be suitably apportioned to the several departments of the school. The proportions, for the average school, will be about these: Cradle Roll and Beginners, ages from about 3 to 5, 10 per cent; Primary, ages 6 to 8, 10 per cent; Junior, 9 to 11, 10 per cent; Intermediate, 12 to 14, 10 per cent; Senior, 15 to 17, 10 per cent; Young People, 18 to 23, 20 per cent; Adult, 24 and over, 30 per cent. This means that for a school of 600, for example, with a total of 9,000 square feet of floor space for educational uses, 900 square feet will be assigned to each of the first five departments named, 1,800 square feet to the Young People, and 2,700 square feet to the Adults. If the adults use the church auditorium or the recreation room for assembly, or if the adults hold no assembly for the adult department as a whole, as is frequently the case, then it is not necessary, of course, to provide an adult assembly room at all. In this case, in building for a school of 600 pupils, there will be left of the total of 9,000 square feet of floor space, after providing for all the departments, sufficient space probably for corridors, toilets and the other needed facilities. The heights of assembly rooms and classrooms in the schoolhouse will vary from 8 to 12 feet, according to the size of the school and of the assembly rooms, and the average ceiling will be about 10 feet in height.


ISOMETRIC DRAWING SHOWING INTERIOR OF CABINET
MINIMUM INSIDE DIMENSIONS 12"x17"
SERVICE CABINET
LOCK ON CORRIDOR SIDE
PLAN

Suggestion for Receptacle for Records

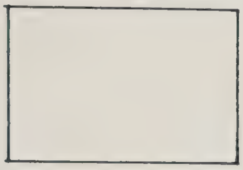
The proportionate sizes of the departments in the Sunday school will vary greatly, as a matter of course, in different localities, and the approximate average proportions as given here are useful only as a basis of comparison in planning. The architect, however, should be on his guard against planning in accordance with present existing proportions in any given school, as these proportions may be materially changed with a new building and suitable equipment. The present number of Intermediates, for example, may be relatively small on account of lack of adequate departmental provision, and might easily be doubled within a year in the new schoolhouse. The same might be true of some other department. Furthermore, in general, provision should be made for the growth of the school, except in the exceptional community where it seems to be evident that no considerable increase in attendance can be expected, even with improved facilities.

As to the location of the church schoolhouse in relation to the church auditorium and the recreational room, no hard and fast rule can be laid down. It depends on the size and shape and slope and surroundings of the church lot. The schoolhouse may be under the same roof with the church auditorium, or under a separate roof, but the two buildings should be close to each other, with easy intercommunication, and with at least one solid, soundproof wall separating the one from the other.

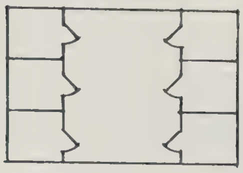
*Assembly Rooms and Classrooms.* A schoolhouse is not a schoolhouse unless it contains classrooms, one for each class; and a classroom is not a classroom unless it has soundproof walls and actual doors opening into a larger assembly room or a corridor. Every teacher needs for his class alone a room with four soundproof walls, for the common sense reason that all sights and sounds coming from any source other than from his own particular group are of necessity in the nature of distractions and make impossible his best teaching. Any teacher can do far more effective teaching with his class alone in an individual classroom than in the midst of hubbub where there are seven or seventeen classes being taught at the same time in the same room. This truth holds with the classes of younger children as well as with the classes of older pupils. If the children in the Beginners Department are divided into classes for a part of the school session, then each class needs its own small room—for the same reasons that the department as a whole needs its own separate assembly room for its distinctive departmental work. The superintendent of the department needs an assembly room in order to handle effectively the whole department as a unit, and, for the same reasons, each teacher needs a classroom in order to handle effectively her class as a unit. Indeed, the younger the children the more they are influenced by their material surroundings, and the greater the necessity therefore for classrooms as well as assembly rooms.

*Sizes and Proportions of Rooms.* The floor space of each departmental unit should be divided between assembly room and classrooms in the proportion of seven to eight, each pupil being allowed 7 square feet of space in the assembly room and 8 square feet in the classroom. The allowance of 7 square feet in assembly room provides also for aisle, piano and partition spaces, and the 8 square feet in the classroom includes the space needed for partitions.

In a school of 500 or 600, the Beginners will require four small classrooms, about 8 by 10 feet each, in addition to the assembly room. In the Primary department there will be needed six class-



DEPARTMENTAL UNIT
WITHOUT CLASSROOMS



DEPARTMENTAL UNIT
WITH CLASSROOMS

rooms, about 8 or 9 by 10 feet, in addition to the assembly room. There should be a Cradle Roll room and a Mothers' room, both near the Beginners and Primary units, but with no direct connection with either. In a school of the same size there will be needed six classrooms in the Junior department, six in the Intermediate department, and six in the Senior department. In each of these departments it is advisable to have the classroom a little larger than in the Beginners and Primary departments, and to make the assembly room proportions a little smaller if necessary. For the Young People there will be needed at least four classrooms, which should be considerably larger than the classrooms in the departments already mentioned. At least four adult classrooms will be needed. The largest adult classroom should be on the first floor if possible, easily accessible from the street, and it might be used for various other purposes—prayer meeting, missionary meetings, conferences, social functions, etc. It is advisable, usually, to have the younger children on the first floor, though this is not absolutely necessary. In planning for a small school, each departmental unit may be divided into three rooms, one room larger than either of the other two, to be used as an assembly room and also as a classroom.

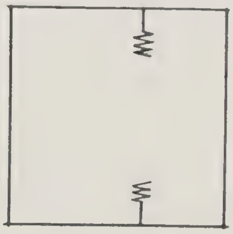
It should be kept in mind that the requirement of 15 square feet of floor space for each individual holds even where there are no classrooms, when all the classes of a department are handled in the one large room, the members of each class being seated around a table. In this case there must be left, between class and class, room for the free movement of the workers, and there must also be sufficient floor space between classes to make possible a fair degree of removal of class noises from class noises.

In other words, the addition of six classrooms in a Junior department of 60 members, for instance, does not increase the total floor space of 900 square feet, but only effects a better utilization of the space, and therefore makes the cost of classrooms less than the small cost of the separating partitions, for the reason that these partitions save practically their own cost, because their presence lessens the dimensions otherwise necessary for floor and ceiling girders and beams to span a larger one-room space. When this type of construction, with assembly room and classrooms, is compared with the obsolete "Akron" combination of high room with two tiers of "stalls," its cost is materially less, for the reason that it utilizes the upper half of the space that is obviously wasted in the other type of construction.

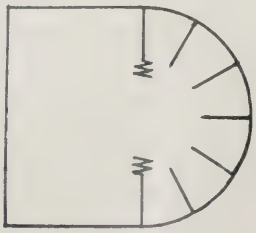
Of course, it never should be permitted that an argument for economy prevail when the educational interests of childhood and youth are at stake, but frequently I have been compelled to resort to it in order to get a church building committee to adopt classrooms. When I assumed the initiative in advocacy of separate classrooms with permanent partitions, in the church schoolhouse, beginning in 1906, in connection with my educational work, I invariably met the objection that the idea was an ideal that was impossible of attainment, because of the prohibitive additional cost of classrooms. In seeking to meet this objection I discovered, in 1910, that it was possible to have classrooms, in addition to assembly rooms, without increase of floor area, and with practically no additional cost, and, since that time, I have demonstrated this fact in various buildings in different sections of the country, and have advocated in my writings and in my addresses in 34 states of the union and with classes in schools, classrooms with permanent partitions and hinged doors for all the classes in the Sunday school. Both the advisability and the practicability of such rooms now are quite generally accepted by the church leaders in practically all the denominations, though there are church committees here and there that still need to be convinced.

*Various Other Provisions.* It is advisable usually, for various reasons, to depend on natural ventilation in the schoolhouse of the church. It is desirable, therefore, that each classroom have at least one outside window, and that each assembly room have at least two outside windows. It is necessary, sometimes, in order to secure outside light for the class-

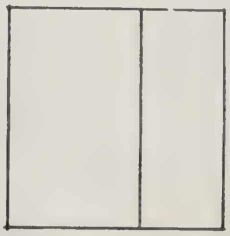
ONE-ROOM
CHURCH BUILDING



SAME BUILDING WITH
ADDED SUNDAY SCHOOL ROOM



SAME BUILDING WITH
AKRON PLAN



CHURCH AUDITORIUM WITH
SEPARATED EDUCATIONAL
UNITS

Assembly Room, New York Bible Society Building
Wilfred E. Anthony, Architect

rooms, to locate them so that each will open into a corridor, instead of immediately into the assembly room. Proper ventilation will be greatly facilitated if each window is provided with a transom, opening from the top inward, with regulating attachment making adjustment possible. This arrangement will give ventilation without drafts. The windows themselves, of course, should be made to raise and lower. Pupils may be protected from drafts from the bottoms of windows by sloping glass shields. All inside classroom doors and assembly room doors should have transoms, for ventilation. Good ventilation is a prime requisite for successful work.

All classrooms and assembly rooms should be well lighted from the outside wherever it is at all possible. The light should be diffused as far as practicable, and should come from the rear and sides of each room. Obscured glass is preferable to clear glass, since it aids in the diffusion of the light and also increases the effect of separateness and of coziness within the room. Glare should be eliminated by means of double shades on rollers.

Care should be taken to provide adequate corridors and stairways. All connections should be as direct and easy as possible. Offices and library rooms will be needed in the schoolhouse of the church. Adequate and convenient toilet facilities should be provided, particularly for the lower grades. For the Beginners department, there should be provided a cabinet for supplies and a room for wraps. The same provision is needed for the Primary department. The room for wraps should be so constructed as not to interfere with the symmetry and beauty of the assembly room, or of any classroom. Above the Primary department, each classroom should have its own provision for wraps and for supplies. Usually it is advisable to provide such facilities at one end of the classroom. Each classroom should be provided with a receptacle in the partition for its records and offering, with a small door opening inside and another opening outside, for the lessening of classroom interruptions. It is advisable for each classroom door to have in it a glazed slit, to facilitate inspection by officers and visitors without interruption of class activities.

Each classroom should have a small blackboard, to be used by the teacher principally and occasionally by a student. This blackboard should be placed as inconspicuously as possible. If built in, it should be covered with a curtain when not in use, or preferably by doors or panels. Some teachers prefer a lightweight portable blackboard. In every classroom there should be a few well selected, graded pictures. All pupils should be seated comfortably and conveniently, using chairs which should correspond in finish with the finish of the room and be in harmony with its color scheme. Student chairs, with tablearms for writing, are desirable for all classes above the primary grades.

All classrooms and assembly rooms in their interior finish and trim should express the best in ideals and practice, and the color schemes and decorations should be such as will develop in the pupils a sense of comfort and well-being, as an aid in religious education. In rooms having an abundance of direct sunlight, the cooler tints of green, blue-green, light blue, and gray should prevail. In rooms with less light, the warmer tints of yellow, or orange-yellow, should prevail. The stronger tones of blue and of red should be avoided, because such colors are trying to the eye and promote restlessness on the part of the pupils.

# Stained Glass Construction and Details—II

*By* WILBUR HERBERT BURNHAM, *Artist-Craftsman*

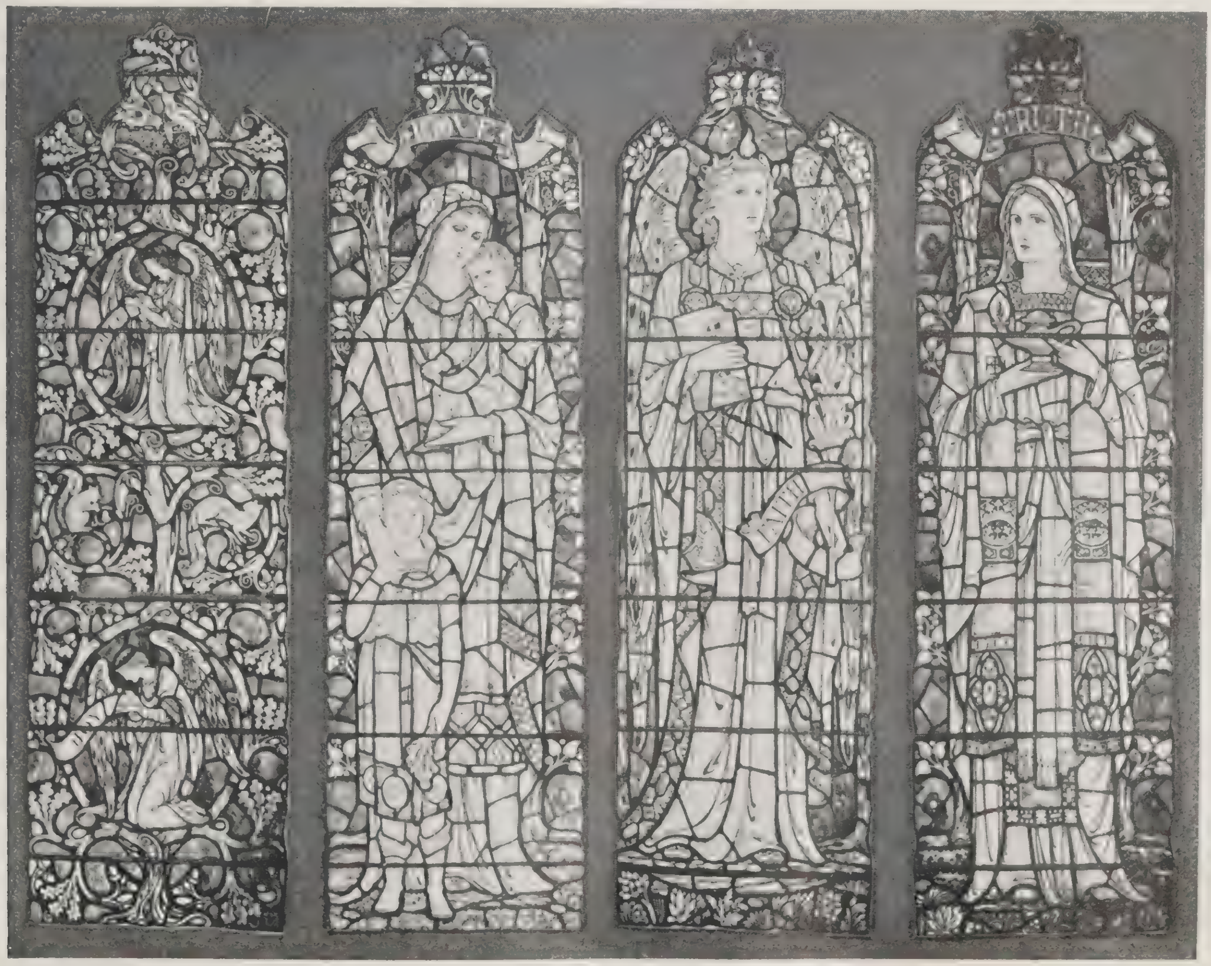
*With Illustrations by the Author*

FROM the early Christian period, decoration, in its various forms, appealing to the sense of beauty, has been pressed into service to memorialize the dead. The art of stained glass, while it is not as ancient as other mediums of expression, has for centuries been utilized to commemorate the virtues of the departed. For the Christian memorial, stained glass is the supreme expression in terms of color, for in this medium, as in no other, pure transparent color is enhanced and glorified by the light of heaven, without the aid of which it possesses little interest.

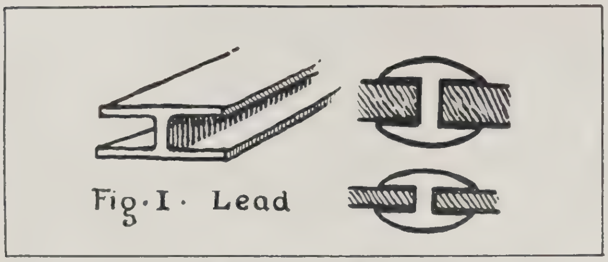
It was during the great period of Gothic architecture that stained glass, presumably the outgrowth of the enamelers' art, had its real beginning, and under the patronage of the Church the art flourished, reaching its zenith in the twelfth and thirteenth centuries, notably in France. Even to this day, in spite of its fragility, the cathedrals and churches of France, and in many instances, England, are aglow with marvelous gem-like windows, the work of master craftsmen of the middle ages.

If we study the work of these mediæval craftsmen, we find what their medium was truly meant for. A pleasing harmony of pure color, good design and leading, the essential factors upon which stained glass must depend, were forever before them, and the innumerable examples of their genius for centuries inspired lovers of color. Why is it that we today cannot make windows like the old examples? Has the art been lost? Surely, every worker in stained glass has been asked these questions many times. Although the art itself has never been lost, a proper appreciation for its basic principles was for centuries almost entirely forgotten, resulting in a vast number of ugly pictures in glass,—the result primarily of the advances made in the technique of painting.

Fortunately, the art of stained glass is again taking its rightful place in the art world, and the numerous beautiful windows, made in America and installed in our American churches, bear eloquent

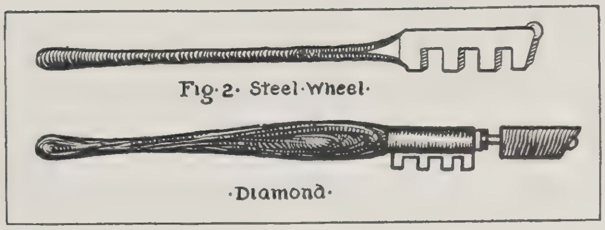


**Cartoon for a Window of Four Lights**
*By Wilbur Herbert Burnham*



Fig·I· Lead

Form of Strips Used for Leading



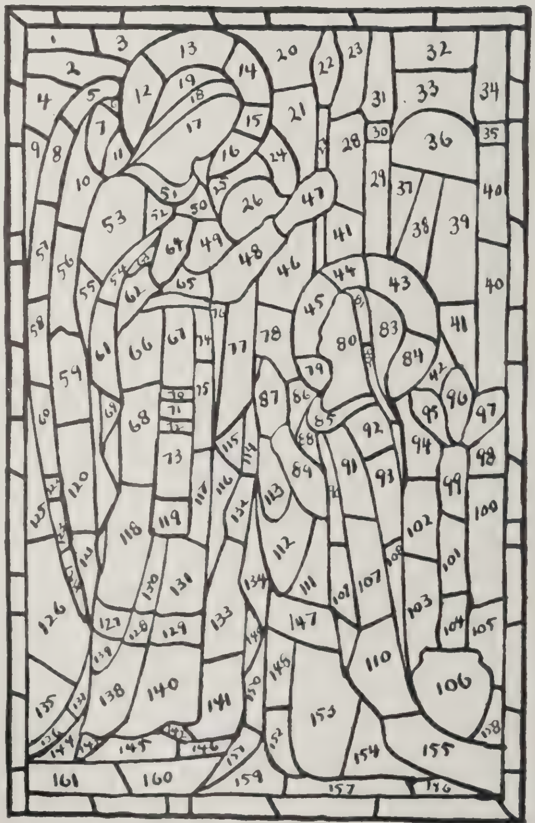
Tools for Cutting Glass

testimony to the progress made by several of our craftsmen. This new uplift of an otherwise degraded art is in no small part due to the progress and achievements of thoughtful architects. Their development of ecclesiastical architecture has inspired many of our younger craftsmen to loftier ideals, and through intensive study of the masterpieces in France and England they have become imbued with the spirit of mediæval work, and do not expect their artistic efforts to attain the impossible. To be sure, a modern spirit in design and drawing is evident, and it should be; for after all the naïvely drawn, and as some writers have expressed it, crudely drawn, figures of the earliest work, are not an essential part of the craft.

As regards stained glass, few people in almost any community are familiar with the art. Indeed, outside of the fact that glass is employed, they have no idea of the craft, nor do they even pretend to know what they admire. A stained glass window is composed of small pieces of white and colored glass held firmly together by strips of grooved lead (Fig. 1) soldered at the joints. It must be clearly understood that the color, the real glory of stained glass, is not painted on the glass, but is produced when the glass is manufactured. Various metallic oxides mixed with the glass while it is in a molten state produce the coloring. It can be readily seen that whenever a change in color is desired in a window, a separate piece of glass must be cut. With a few exceptions, the color pervades the whole piece of glass, and its unequal thickness makes the thin part light and the thick part dark. "Flashed" glass is white glass covered with a layer of colored glass. Beautiful effects can be obtained by eating away parts of the colored glass with hydrofluoric acid. Modern glass manufacturers are making flashed glass in various colors, all highly useful to the artist. The only paint used in the making of a window is an opaque, vitrifiable pigment, used merely to delineate form and detail. No actual color is ever painted on the glass, except a "stain," an early fourteenth century discovery. White glass, with the use of this stain, produces, after firing in a kiln or oven, a beautiful transparent yellow varying in tint from a light lemon yellow to a rich orange.

Although modern manufacturing assists the present-day craftsmen, the same processes are employed as in the middle ages. In place of moulding the lead by hand, the modern workers buy it all manufactured in various sizes and shapes. Gas and electricity now take the place of charcoal for heating the soldering irons, while the diamond or steel wheel (Fig. 2) is used to cut the glass in place of the primitive method of drawing a red hot iron across the glass, and with sufficient hand pressure breaking the glass in two.

Like other technical arts, the conception and development of stained glass necessitate the employment of several trained craftsmen. As in the mediæval days, the window designer should be a thorough craftsman, capable of not only designing, but painting on the glass and if necessary, leading the window. The general custom of having a worker do one special detail of work and no other is a detriment, and tends to a mechanical sameness in execution. No really serious work is ever



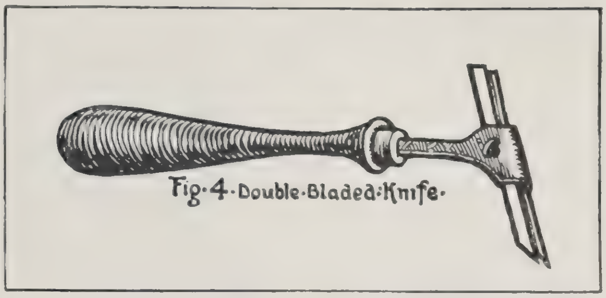
·Fig·3· Cut-Line Drawing·

Working Diagram for Cutting Glass
Pieces Numbered for Workman's Convenience

accomplished unless the group of craftsmen work together in perfect harmony, all striving to produce, not a mere window but a work of art.

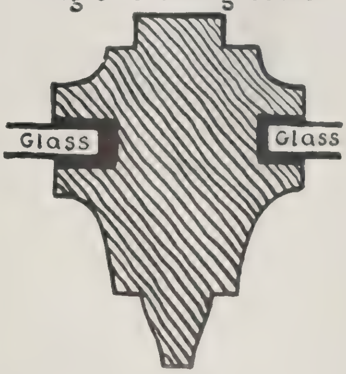
When a glass designer and craftsman is commissioned to make a window, he should first of all, whenever possible, see the building his window is to adorn and study very carefully its lighting conditions and architectural surroundings. Alas! too many of our churches are already filled with windows in which styles and periods have been sadly mixed,—the result in many instances, however, of personal tastes. Now, thanks to many of our architects, even the so-called commercial glass men must keep within certain limitations.

The preliminary design in water color, drawn to scale, serves as a working model for the artist and gives to the client an idea of the appearance of the completed window. After the design has been approved, the next step is to draw the "cartoon," or full-sized drawing in black and white. In this drawing all the details, including lead lines and "stay bars," of which mention will be made later, are very carefully drawn, for this is the most important drawing of all. The cut-line drawing (Fig. 3) which follows is a tracing of all lead lines and bars. This drawing when completed shows very clearly the various shapes and sizes of the glass, and to offset any future difficulties, the shapes are numbered. Later on, when the window is ready for leading or glazing, the cut-line drawing will serve as a guide. With the aid of transfer paper a duplicate of the cut-line drawing, called the pattern drawing, is then made on heavy paper. This drawing is cut into separate patterns with a double-bladed knife (Fig. 4), but before cutting the patterns are numbered as on the cut-line drawing. The double-bladed knife cuts the patterns and at the same time cuts out a thin strip of paper, or allowance, for the "heart" of the lead as the center is called. It can be readily seen that without the use of numbers it would be extremely difficult to determine the correct position of each piece of glass, once it is cut. Now, with the water color design as a guide, the colors are selected and with a diamond or steel wheel, the glass is cut to conform to the various shapes of the patterns.

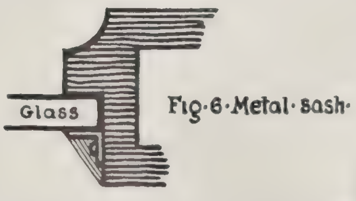

Fig·4·Double·Bladed·Knife·

Knife Used for Cutting Drawing

Fig·5· Stone·grooves



Grooves for Holding Glass



Glass Held in Metal Sash

Then the artist places the pieces of glass upon the cartoon, and traces all drawing lines and details on the glass with the vitrifiable pigment mentioned before. For tracing, varnish and turpentine are usually mixed with the pigment, although certain workers prefer mixing water with the color, which is either brown or black. To prevent any possibility of losing the trace lines in the next process, the glass should be fired in the kiln until the painted lines actually become a part of the glass.

For the ensuing process of painting, it is necessary to set the window in place before the light. A large plate glass easel is therefore placed on a flat bench, with the cut-line drawing placed beneath to aid in solving the puzzle, for each piece of glass must be laid on the easel in its correct position. The pieces of glass must not touch each other, because the allowance for the heart of the lead used later on is necessary. Melted wax is dropped into these spaces at intervals, causing the pieces of glass to hold firmly to the easel. Now, by placing the easel in an upright position before the light, the window is seen for the first time, and any color changes desired are made. Since in the finished window, black lead lines will take the place of the brilliant white lines now visible between the pieces of glass, the spaces are filled, or should be if the craftsman is in love with his work, by filling in with a black paint.

The next step in the painting, the shading so-called, is best when simply done as in the work of the middle ages, but if overdone—and this is where for centuries workers in stained glass sinned both as artists and craftsmen—the window becomes a lifeless, opaque creation. Each piece of glass is covered with a mat of the same pigment used in tracing, with gum arabic as the adhesive medium and water to thin the color. When the color is dry, lights are taken out with a bristle brush or with the finger and palm of the hand, leaving only enough paint to give to the glass an interesting texture, and which if thoughtfully and lovingly done, will mellow the color of the glass without causing loss of any of its particular gem-like brilliance. In approaching the painting of a window, the average glass painter pays but little attention to the distance the window is to be seen, painting a clerestory window as he would a small window that is to be seen at a close range. This is wrong. Light plays many tricks when shining through glass. A clerestory window must be painted boldly, with the use of heavy trace lines, getting a result that is strong in design and rich in color.

With the painting completed, the pieces of glass are removed from the easel and fired in the kiln so that the painted surface feels smooth. Again the glass must be waxed up on the easel and painted for the second time, for the intense heat in the kiln has probably reduced the paint and in some cases burned it almost entirely away. Even a third painting is not infrequent, and a special firing for stain gives the most satisfactory results.

The glass is now ready to be leaded. The cut-line drawing is laid on the glazing bench; a straight edge of wood is nailed to the base and a piece the length of the drawing to one side. Long strips of wide lead are placed against these wooden bars and, beginning in the corner, a piece of glass is fitted into the grooves of both leads. A strip of smaller lead is now cut long enough to cover the opposite sides of the piece of glass, and into the free grooves of this lead the next piece of glass is inserted, and so on, until all the pieces are leaded and the joints soldered.

A Famous Window in "Grisaille," North Transept, Salisbury Cathedral

The window is now complete as a work of art, but one more process is necessary before the window can be installed. The window is laid on a flat bench and completely covered with a waterproofing cement, composed of Portland cement, whiting, lampblack, boiled linseed oil, turpentine and a patent dryer. With a stiff brush the cement is rubbed into the leads on both sides of the window, and after cleaning off the glass, the cement is allowed to dry and harden.

To enable the window to resist wind pressure, horizontal iron bars are fastened into the window sash at intervals, and to these bars the window is joined by small pieces of copper wire soldered to the lead and twisted around the bars. In early windows these bars frequently were bent to conform to the designs of the windows. Especially in the late thirteenth century, when the great medallion windows were made, the bars were a governing factor in the design, and these heavy black lines gave contrast to the color and strength to the design.

In the setting of a window the glass worker is frequently confronted with difficulties. When a window is to be set in stone, the grooves are sometimes made too shallow, and the setter finds it necessary to take the window apart at various places in order to insert the glass into the grooves. Whenever the stonework is intricate in design and construction, this cutting apart cannot be avoided. However, if the grooves are made deeper on one side than on the other (Fig. 5) the setting will be made easier, for after inserting the glass into the deep groove, it can be pulled back into the opposite groove without any great difficulty. A wide groove is also helpful to the setter. Fig. 6 illustrates the usual method of setting glass into a metal sash of a commercial type. In the place of a stop bead, as used in an ordinary wood sash, small metal clips are screwed into the sash to hold the glass firmly in place.

This concludes a brief description of the many interesting processes necessary to the making and installing of a stained glass window. As has already been said, the art of the glass worker has never been forgotten, but ages of neglect of its best practice resulted in debasement from which the art has been long in recovering. Today its principles are once more understood and practiced, and stimulated by the encouragement which has followed the revival of interest in everything connected with church architecture, the art of stained glass has resumed its place high in the company of the arts which serve as the handmaids of religion. It will without doubt achieve triumphs as notable as any in its past.

# The Architect and the Building Committee

*By* GEORGE E. MERRILL

*Architect-Secretary, Department of Architecture, The American Baptist Home Mission Society*

"NEVER again!" Such is the sentiment all too frequently expressed with vigor by architects who have sacrificially endeavored to serve a church, only to have their efforts misunderstood and to find themselves blamed for a lack of results not at all the fault of the architect. Fortunately such experiences are not universally met with, or the situation would be tragic, but differences between churches and architects do arise, and seemingly more frequently than in other lines of building work. Can these misunderstandings be avoided and a happy handling result? From a study of hundreds of church building projects, we know that this *can* be done, and, where the proper steps are taken, that this is *being* done. The purpose of this article is to make clear the way. Permit the writer to say that he has functioned happily both as chairman of a building committee, having to select and deal with the architect, and, in other instances, as the architect himself, having to deal with a church building committee.

The same committee member and the same architect, having cordial relations all through the erection of a commercial structure, may have serious differences ere a church is built. The owner of the commercial building, thoroughly informed in his own particular line by searching analysis and by visiting in his travels other buildings similar in character, knows what he wishes and can make the matter clear to his architect. No lack of understanding exists. The architect, skilled in commercial building work, knows how to interpret the owner's wishes, and a satisfactory handling results. A church committeeman visits but rarely other churches outside of his own home city; furthermore, he understands but little of his own church aside from his own individual line of activity. He is generally unaware that in the past few years the requirements of the church in its building arrangements have undergone a revolutionary change. Attempt to discuss with him a five-fold program, or as to whether six or eight departments shall be provided for the church school, and he will not understand what is meant. If by some fortunate circumstance he does have some understanding of such matters, commensurate with his knowledge as to his commercial building needs, he may have an architect for the church who does not understand, and so the committeeman, usurping the architect's prerogative, directs that this and that be done to revise the plans submitted. The net result is a church structure highly unsatisfactory for use, and "the architect is to blame." The lack of understanding is frequently as chargeable to the architect as to the committeeman.

In accomplishing a desired satisfactory building result, the work of the committee and the work of the architect are distinctly different, because they deal in entirely different realms. It is the duty of the committee to furnish the program of daily activities and determine the capacity requirements, and that of the architect to not only provide the requirements but to so plan the building as to ideally house the activities.

Let us suggest one method of procedure which, when consistently employed, operates to produce a happy building. The initial step is for the church to officially choose a general committee, not limited to the official board, but including the pastor or rector and as many active members as are desired, who are representative of each of the boards and organizations within the church, the younger people as well as the older, and of both sexes. This committee may well consist of as many as 20 members, for it is charged with responsibility along four distinct lines of procedure. This committee should be authorized to incur such initial expense as may be necessary to discover the church's building needs. When this general committee organizes, it will appoint from its own committee members four sub-committees, of say five members each, (1) on program and requirements, (2) on architect and building, (3) on ways and means, and (4) on publicity and collections. While each sub-committee will at once begin to study its own duties, and gather data to that end, the sub-committee on program and requirements will be the first to actively function. Of this committee the pastor or rector should certainly be a member; indeed he may well be an ex-officio member of all sub-committees.

The program and requirements committee should begin its deliberations by engaging a thoroughly informed church architectural adviser at a fixed fee; it should analyze the community to be served; study the church membership and its constituency; discover wherein the church has failed to function and why; judge as to how best to develop new contacts; weigh possibilities for new activities; determine what facilities are to be provided or space to be allotted for the activities, both old and new; decide as to the relative importance of the several needs; fix upon a site and set the financial goal to be attained. This sub-committee on program and requirements should report its findings to the general committee with sketch plan studies illustrative of its recommendations, and, when approved by the general committee, this report should be submitted by the general committee to the church for its adoption and for authority to commission a practicing architect and proceed with the work. A printed ballot mailed to each member of the parish with a line for his signature and a space for voting "yes" or "no" has been used with great success for reasons at once apparent. It is vital that each member of the church at this point shall have had an opportunity of having his full say. This shuts out later fault finding, and commits the entire parish to the procedure.

While the sub-committee on program and requirements has been at work, the sub-committee on architect and building will have been making investigations; the sub-committee on ways and means will have been canvassing in a general way the financial resources of the church for its building project; the sub-committee on publicity and collections will be gathering preliminary data. All being members of the general committee, they will be fully informed through conferences with the sub-committee on program and requirements, so that, immediately the church has authorized the general committee to proceed with the building, these other sub-committees will be ready to function.

The general committee, now authorized by the church's membership to proceed along definite lines, engages an architect for the building. The sub-committee on architect and building will recommend, and the general committee will act. The building committee will appoint *one* of its number to have all dealings, preferably in writing, with the architect. Changes, that chief element causing exasperation and added cost to architects, are now avoided. The time for backing and filling is past, the program is set, and the requirements are established, so that the architect, furnished with this data, may proceed to develop his drawings and other documents which, when approved by the general committee, are sent to contractors for offers, and contracts for the building are let on the sanction of the general committee.

The sub-committee on ways and means will not encounter adverse criticism, since by vote each member of the church has committed himself with regard to the project. There can be no complaint of "taxation without representation." The canvass for subscriptions having been completed, the sub-committee on ways and means may cease to function, but often it remains active, seeking to enlist newcomers in the building enterprise; in any event, its members remain active on the general committee. The sub-committee on publicity and collections will work "hand in glove" with that on ways and means. One need not go into detail as to methods, except to say that an illustrated booklet of the proposed building, giving full explanations, is one of the most helpful aids which this sub-committee can render the sub-committee on ways and means. Collections on subscriptions usually outrun the completion of the building, so that this sub-committee generally functions even beyond the life of the general committee.

A few comments about the architectural adviser during the preliminary work of the sub-committee on program and requirements may be helpful. The choice of the architectural adviser is a crucial step. The man selected must not only be competent architecturally but he must have an intimate first-hand knowledge of the inner workings of a modern church program in all of its parts, and be qualified to point out to the sub-committee on program and requirements wherein their proposed program is unbalanced or behind the times. He will furnish a comprehensive questionnaire, such as is suggested upon page 163, to the committee to assist it in making its entire analysis. He is charged with the responsibility of pointing out to this sub-committee what other churches similarly situated are doing, and leaving the decision to the committee. He will advise upon the matter of site, and furnish an illustrative sketch plan showing how the desired program may function, how the capacity requirements for each activity be obtained, and how all portions of the proposed structure may be properly coördinated. To this end seven religious denominations have now organized bureaus or departments of architecture which specialize in furnishing the consultation and advice just referred to. These advisers do not supplant the practicing architect, but devote their entire attention to an analytical study of the constantly growing needs of the church in its five-fold activities. With the denominational contacts back of these church advisers, with their constant and intimate association with religious educational and other specialists, there is now wealth of data available for both the churches and the architects, not previously obtainable.

One of the many benefits resulting from the united efforts of these advisers is their insistence, to the churches served, that worthy architects be employed, namely those thoroughly qualified by education, experience, ability and character. By this emphasis churches are coming to realize that satisfactory church buildings do not just "happen"; that the final result is fixed from the start by the ability of the architect chosen; that the church should insist upon paying the full architectural fee and thus avoid finding itself under obligation to its architect because he has made a donation.

The architect's dealings, being conducted as already said, with one individual, instead of his having to hold innumerable conferences with a large committee, and the architect being given a signed statement as to program and a written report as to requirements, together with an outline of an especially studied solution to illustrate the particular project in hand, he finds himself, at the start, fully informed as to the church's wishes, expressed in unmistakable terms.

We have, then, a comparatively new situation in church building work, brought about by a recognition of the fact that, a new day having dawned in church building requirements, special study by experts employed for the purpose is necessary to discover the exact nature of the new and changing needs and to make these clear to the architectural profession. It is recognized that, just as no church can carry out satisfactorily a given program without proper facilities, so also as has been said, "the very character of a church is determined by the plan, arrangements and the appearance of its buildings"; an astounding statement, but true.

## REPORT OF CONDITIONS COVERING BUILDING PROJECT FOR:—

Name of Church........City........State........

Reported by........Pastor........Layman........

Street Address........Date........

Answer FULLY using separate sheet if necessary.

CHURCH

Seating Capacity Desired?........

Membership?........ Average Attendance?........Percentage of Membership Increase in last 5 years?........%

Use of Building for other than regular services?........

| SUNDAY SCHOOL | Ages. | Enrollment. | (Do not include Home Dept.) | Ages. | Enrollment. |
|---|---|---|---|---|---|
| Cradle Roll | 1-3 yrs. | ........ | Intermediates | 12-14 yrs. | ........ |
| Beginners | 4-5 yrs. | ........ | Seniors | 15-17 yrs. | ........ |
| Primary | 6-8 yrs. | ........ | Young People | 18-24 yrs. | ........ |
| Juniors | 9-11 yrs. | ........ | Adults | 25 yrs. up. | ........ |

Average attendance of entire school........ Growth of School to be provided for........%

COMMUNITY

Population (1 mile radius)?........Estimated Growth?........

Character and Principal Industries?........

........

Locality of Proposed Building:

High Grade Residence........ Suburb (distance from center of city)........

Cheaper Residence........ Downtown District........

Apartment House District........ Factory District........

College Center........ Foreign District (give nationality)........

Distance from nearest church building of the same denomination?........

Public Institutions for Community Welfare?........

What is largest meeting place?........ Seating capacity........

Recreation Centers available?........ Gymnasium needed?........ If so, why and size?........

Community attractions tending to draw from the church?........

PROGRAM OF CHURCH'S WORK. (Describe in full, giving list of all Sunday and week day activities to be carried on in the church buildings):

........

........

BUILDING DESIRED. Describe present situation, reasons for building, and just what building is wanted, and whether new, alteration or addition. If sexton's living quarters are to be provided, give facts. Use separate sheet and answer in detail........

Say from what direction is major approach to site and why........

CHOIR. Accommodation, Kind........For how many?........ Where?........

ORGAN. Probable cost? $........Describe organ........

........

ARCHITECTURE. Name any decided preference as to architectural style?........ of {Stone / Brick / Wood}........

ARCHITECT. Have you engaged your architect?........If so, give name and address........

FINANCES

Best Property in Community (price front foot)?........ Your Lot (price front foot)?........

Cost of Building? (Do not include furnishings) 1st Unit $........ 2nd Unit $........ Total $........

Is congregation financially able to build adequately?........

# What Church Architecture Means to the Minister

*By* REV. LOUIS C. CORNISH

DOES your church edifice help or hinder the life of your parish? Is your church plant,—church, parish house and parsonage,—an asset or a liability? Does it lift, or is it a load to be carried? Does it create enthusiasm or depression? Do people love and venerate it, or do they merely tolerate or even dislike it?

Ask the ministers in all parts of the country these questions, as I have done for some years, and their answers will reveal in good measure what church architecture means to them. Furthermore, the answers can be summarized fairly well, there being always a *something plus* at the end of the category. All will agree on strategic location, adequacy of buildings for their purposes, dignity, and it may be—beauty. These are the obvious requisites and tend to follow the sequence here given them. Beyond them lie considerations less easily listed, but of primary importance. Aside from location, size, type or cost, to satisfy the intelligent minister the church must be "worshipful." If it is to be an asset, the church must be itself a symbol, even an embodiment, of its high purpose, and must express to the worshipers harmony and a sense of the eternal mysteries.

Failure to attain these values is frequently due, and every architect knows it well, to the ignorance of committees and sometimes of ministers, who refuse good advice and insist upon following their own poor judgment; and it is due also, and many able architects fail to realize this, to the vagaries of architects who care little for religion and are profoundly ignorant of what a church attempts to achieve. "What would you do with it if it were yours?" asked a noted preacher of a well known leader to whom he had shown a great pile of brown stone and red tiled roof and tower, erected by an architect of high repute but uninterested in churches. The reply was, "Tear it down and let a religious architect rebuild it."

The lack of religious embodiment in church building finds plentiful illustration, often of amazing crudity. Imagine, for example, a church, parish house and parsonage to be erected on a strategic corner lot in a large city. The plan showed the parish house apparently in violent collision with the church. The "church auditorium" was square. One wall was broken by a high proscenium arch, filled by a split and roll wooden curtain which shut off the stage. The pulpit stood shyly in a corner. Theater chairs, arranged on pivots, turned either toward pulpit or stage. Yet the designer had been trained in schools of good repute. What could such an arrangement mean to a minister, in conducting worship, except humiliation and handicap? Unfortunately, this is not an exaggeration. Buildings of similar crudity are familiar throughout the country.

By way of contrast, take what is perhaps the most elaborate attempt in late years at religious symbolism. One enters the Memorial Church at Fairhaven, Massachusetts, through a deep porch, above which rises a stone cross of delicate design. It does not command; it gently challenges. The meaning is clear: only through the shadow of the cross, by self-sacrifice, do men enter the religious life. Great bronze doors open into the porch. Around the panels in decorative niches are figures of the saints, ancient and modern; the fellowship of the saints welcomes you to its high comradeship. In the marble pavement, suggesting but not insisting, are inlaid the signs of the zodiac, the ancient symbols of the outermost realms of space; he who lays hold on religion gains truth that is universal, as true in distant constellations as on this planet. In the beautiful stone baptistry beneath the high tower stands a noble font. Over it hangs a tabernacle or canopy made of olive wood brought from the Mount of Olives, enshrining a multitude of tiny figures of the saints, skillfully carved at Oberammergau; the striving of the saints through the centuries blesses the baptism. At the chancel end of the church rises a glorious window, the "Adoration," typifying the leadership of Jesus and the mystery and divine possibility of life for all the children of men. One may visit this shrine times without number and always find some fresh and delicate religious suggestion through the symbols of truths that are old and yet forever new. Costing sums estimated at millions of dollars, obviously this is a unique edifice. Many would not wish its elaboration of beauty, even if free to choose it; but the essential values here embodied in a multitude of details can be expressed in far simpler form.

"The quest for an auditorium" might well describe much church building during the latter half of the past century. "The quest for a church" has built many modest but lovely structures. Most of our eighteenth century churches bear witness. Those built in the earlier part of the nineteenth century also testify. Those of the latter half of the past century, however, disclose a confusion of quests. More recently there has been a marked and encouraging increase in the reverent quests for the church. To the minister, the architecture of his church is of supreme importance. It means a blessing or a curse upon his efforts to serve both God and man.

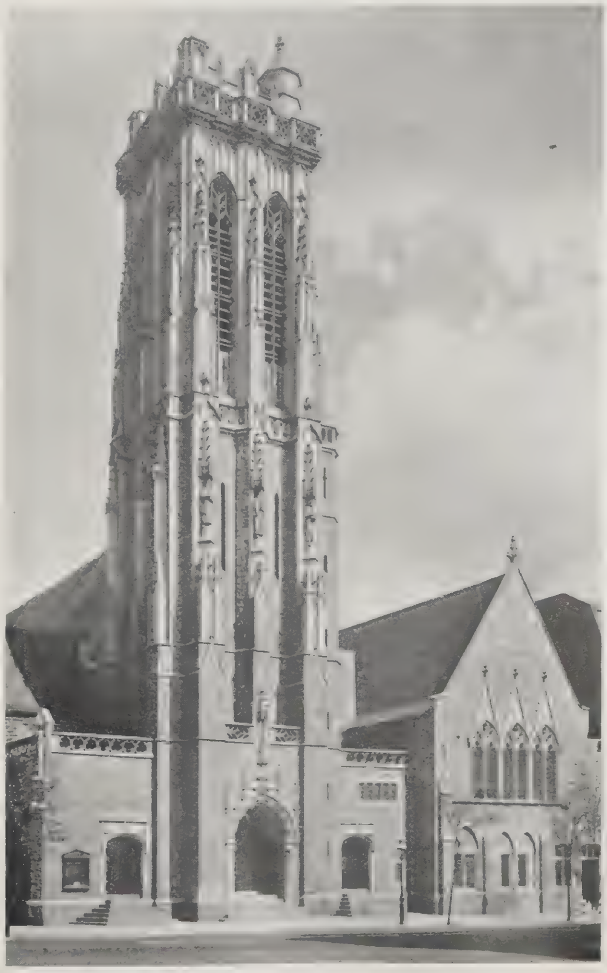
# Architectural Requirements of the Episcopal Church

*By* REV. DR. HUGH BIRCKHEAD

*Rector of Emmanuel Church, Baltimore*

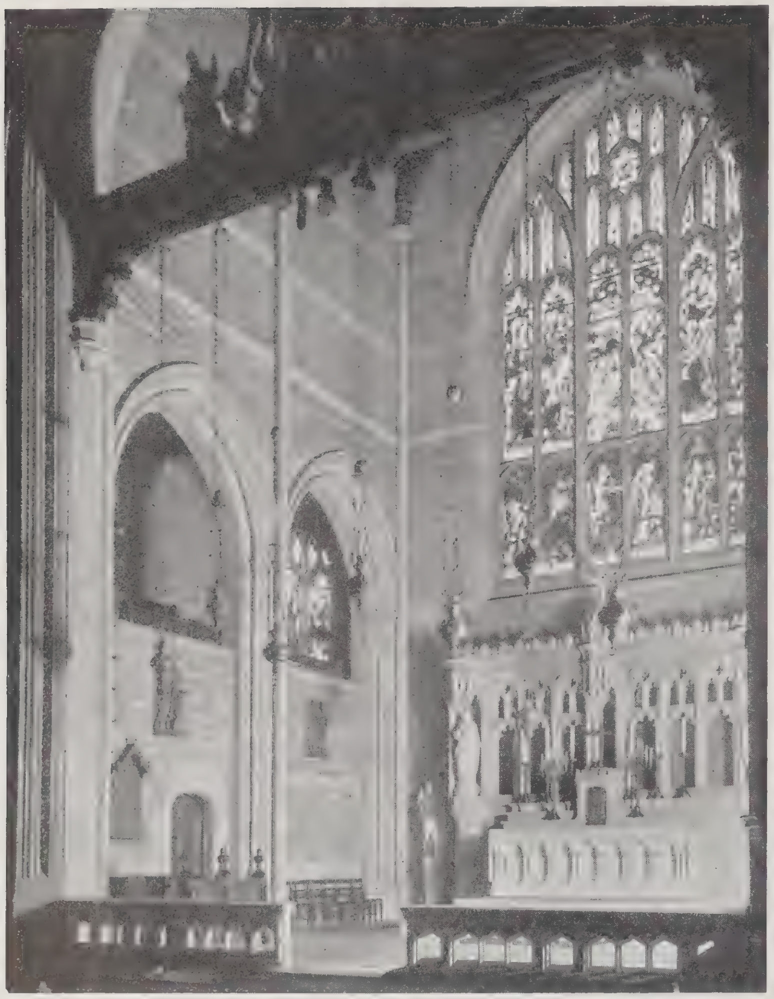
THE condition of ecclesiastical architecture in America represents adequately the present vagueness in regard to the requirements for a building to be used for the purposes of worship. It is lamentable that belief and prejudice, as well as reaction, have so greatly interfered with architectural form. A great many churches symbolize a strong grudge or a permanent fear of the beautiful, which was one of the definite results of the Reformation, and yet with the gradual growth of a broader culture and greater discrimination in American life we desire, and are willing to pay for, more comely places of worship; but these must still preserve certain marks of sectarian difference, and hence the average architect, having in mind the consistent beauty of the churches and cathedrals of the old world, is thwarted by a constant compromise between what should be and what must be. One of the problems which face him at the start is the effort to put into a building which is primarily an auditorium in most cases the lines and feeling of a sanctuary.

The Episcopal Church is the most inclusive group among the 202 religious bodies into which Christianity in America is divided. Its worship varies from the rigorous simplicity of a Protestant service to the elaborateness and sensuous appeal of the Church of Rome. It is thus impossible to describe any one building as possessing all the attributes and requirements for every congregation. In New York, for instance, there are three outstanding examples of modern church architecture, all of them satisfactory to the congregations that make use of them, and yet quite different in treatment, conception and atmosphere. St. Bartholomew's, designed by Bertram Grosvenor Goodhue, is a well adapted Byzantine structure in which the salient requirement was an auditorium in which every word can be heard by every worshiper, no matter where he happens to sit. It is severe in its simplicity of outline and beautiful in its detail. Such a building was originally planned by the age that produced it for a service magnificent in color, elaborate in ritual, and with a strong emphasis on the mystical side of religion. St. Thomas', designed by Cram, Goodhue & Ferguson, frankly suggests the Gothic churches of western Europe and England, prior to the Reformation. Here again the lack of color which the service itself was supposed to give is conspicuous, and the auditorium is strongly emphasized. The Church of St. Mary the Virgin, designed by Le Brun, on the other hand, which derives its inspiration from the French Gothic, has a very elaborate and colorful service, with an orchestra, two choirs, many lights, and clouds of incense, and the spoken word is subordinate in the mind of the congregation to the ornate service.



"Christmas Tower," Emmanuel Church, Baltimore
Woldemar H. Ritter, Architect

In the old days the architect was not only a churchman but was also usually a priest or a member of a monastic order. The building he created was an adequate setting for the ritual which he knew and loved. There was not the present divorce between a borrowed background, coming from the centuries when beauty was frankly considered as truly an attribute of God as goodness and truth, and a service which is clad usually in black and white, and is too often a setting for the personality of a preacher. We are perfectly willing to have an elaborate setting provided that it meets our dogmatic differences, especially from the Church of Rome; but the minister and his attendants and the choir must not be expected to conform to the requirements of a building which comes down to us from the days when all the men in the congregation dressed in brilliant colors and when it was quite natural that



Sanctuary, St. Ignatius' Church, New York
Choristers placed in gallery at one side
Charles C. Haight, Architect

the clergy should have their sacred liveries, as the servants of God, equally splendid and in shades representing the Church's seasons of joy or penitence.

The best that has yet been attained follows the lines of Gothic architecture, usually stripped of the element of mystery, and so arranged that everything may be seen at a glance and that the words of the preacher may reach the farthest listener in the auditorium. As a result of these conditions, Gothic architecture has suffered more than any other type; because the rector and vestry do not hesitate to insist upon their own ideas, and because their knowledge of architecture and interest in correctness have yet to be educated into being. Our modern efficiency in lighting is perhaps the greatest enemy to the functions of a church as a place of prayer and meditation. The "dim religious light," which has so much to do with the sacredness of old world churches, has disappeared. It is true that this is also due to the fact that a congregation is expected to read and no longer follows the service from memory or repeats prayers that have been familiar since childhood. The average Protestant church is practically never used for worship between services, and when the congregation is assembled on Sundays, it depends upon the way in which it is led from the chancel, and waits through the processes of a service for the moment when the preacher ascends the pulpit and claims its interest by the force of his mind and personality. What we need, in these days, is a conference of clergy, psychologists, artists and architects to discuss the whole matter of public worship. The beautiful must be given its place once more as a part of the personality of God Himself, and a compromise must be made between the necessity of making the printed page visible and the darkness which in all times has helped to bring God nearer to His kneeling children.

Another misconception which has grown into a custom is the placing of the choir between the congregation and the sanctuary. This was originally done by the monastic orders, as the choir consisted of their own members and occupied a position between the altar and the people. In the cathedrals the choir is a smaller church, used for daily services. There is no excuse for this in an ordinary parish, and it would be a good idea if architects would suggest to congregations that the singers be placed somewhere adjoining the chancel so that they will not arrest the eyes of those in the pews as they look toward the sanctuary.

In closing I wish to make a definite plea to architects, asking them to study carefully the conditions of worship as embodied in form and color; to show more energy in dealing with clergymen and building committees, usually prejudiced and grossly ignorant; and to help us to evolve the American church as something which is beautiful and makes possible the desire for the mystical element in religion as well as the sermon. They must bear in mind that most of us do not know what we want and are waiting to be led with authority, and that after our prejudices have been overcome we are grateful to the wisdom and firmness that have made us choose a better way and given us those things which we had neither the vision nor the experience to know were necessary in a place of prayer. I would also emphasize the fact that the architect who has no religious feelings himself can rarely accomplish "the beauty of holiness" as an academic problem. Let us hope for more men who will make it the mission of their lives to clothe in color and form the unquenchable longing of the average American for a real sense of the nearness of God.

# Acoustics of Church Auditoriums

*By* F. R. WATSON
*University of Illinois*

THE attention of architects is being more and more directed to the question of the acoustics of large audience rooms. The disquieting knowledge of the defective acoustics that exist in many completed halls and the outspoken protests of the auditors create a demand for reliable information by which such defects may be avoided in building new auditoriums. With many architects, however, there is the desire not so much to avoid the defects, as to secure the really desirable feature of acoustic excellence whereby speaking is easily understood and music is rendered under conditions that enhance its delight.

In former years, because of the lack of suitable guidance, the nature of the acoustics was to a great extent a matter of chance, with the result that architects considered it hopeless to attempt to secure acoustic results with certainty. It was also generally believed that the best method of correcting faulty acoustic properties was by stretching wires or installing sounding boards. At the present time, due largely to the painstaking investigations of the late Professor Wallace C. Sabine, the knowledge of the subject has grown to such an extent that auditoriums may be designed with certainty of having satisfactory acoustics, and defective auditoriums are corrected with confidence—but not by using wires and sounding boards, which are shown to have but little effect.

Perfect acoustic conditions in an auditorium are obtained when an average sound rises to a suitable intensity in every part of the room, with no echoes or other distortions of the original sound, and then dies out quickly, so as not to interfere with succeeding sounds. To secure these ideal conditions it is necessary to incorporate three important features in the architectural design. In the first place, the volume of the room should be proportioned to the source of sound so as to insure a suitable loudness; that is, so that each cubic foot of space will be filled with the right amount of energy to comfortably excite the sensation of hearing. Instrumental music, particularly from brass instruments, thus requires a larger volume for distribution of its energy than speaking. The second factor necessary for good acoustics involves a consideration of the positions, sizes and shapes of the walls. These should be arranged so as to avoid the possibility of there

Church of the Sacred Heart, Washington
Murphy & Olmsted, Architects; Maginnis & Walsh, Associate Architects

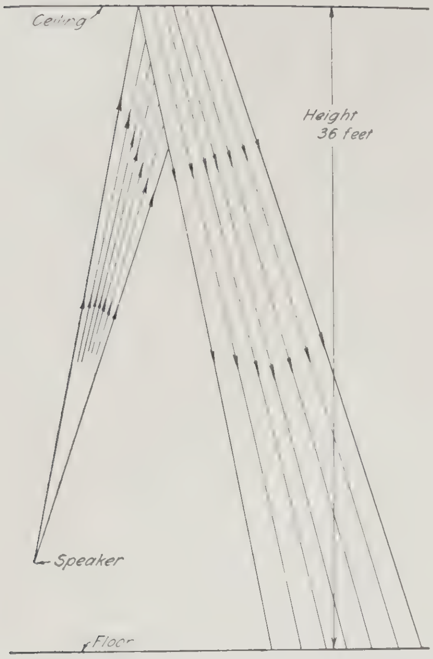


Fig. 1. Reflection of sound from flat ceiling. No defect

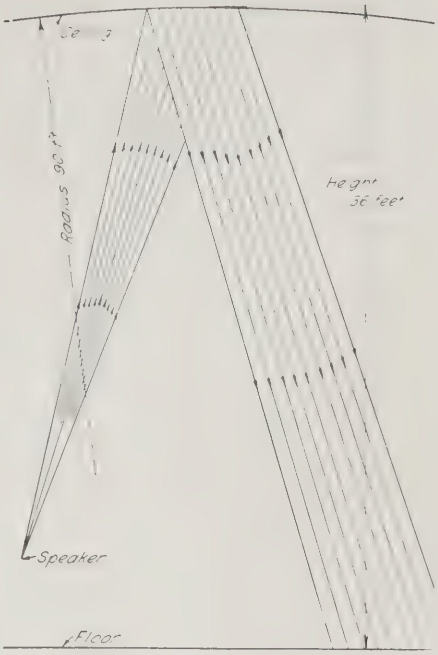


Fig. 2. Radius of curvature more than twice ceiling height

being echoes and other distortions. After the volume and shape of the room are decided, the third and most important item to consider is the character of the interior surfaces, to make sure that the correct amount of sound absorbent will be present to damp out the residual sound or, technically speaking, to reduce the reverberation.

Suppose these general ideas are applied to the particular case of church auditoriums. The sources of sound are three: speaking, vocal music, and instrumental music, usually a pipe organ. A question immediately arises about the volume or cubage of the room, because music is more intense than speaking and requires a larger volume for best effect. The obvious solution will be to compromise on an intermediate size which will be satisfactory unless the music is extremely loud or the speaker's voice is weak. Except for cathedrals, the decision about volume depends also on the probable size of the congregation or audience, and here the further question arises as to how large an auditorium may be and still have acceptable acoustics. Not enough experiments have been made as yet to answer this question with satisfaction, but the writer cites the case of the Eastman Theater, in Rochester, which has a volume of 790,000 cubic feet, accommodates 3,340 auditors, and is considered satisfactory for pipe organ music and also for speaking.

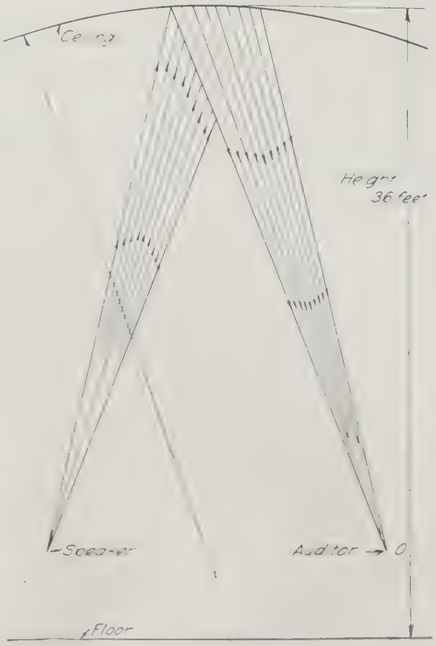


Fig. 3. Radius of curvature nearly equals ceiling height. Marked echo

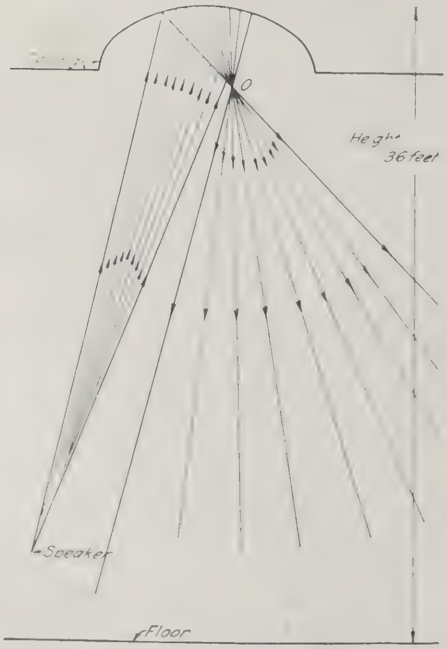


Fig. 4. Radius less than half ceiling height. No marked defect

The effect of the walls of an auditorium in regard to position and shape is readily understood by a geometrical study of the main sections of the room. Sound rays are drawn from the position of the speaker to the various surfaces where reflection takes place. Curved walls, arches and domes concentrate the reflected sound and are quite likely to produce trouble. This does not mean that rooms must always be rectangular for best acoustic effects, but that curved surfaces must be specially designed and placed so as to avoid causing defects. For instance, ceiling surfaces may be curved provided the radius of curvature is either more than twice, or less than half, the ceiling height. Figs. 1 to 4 represent the reflection of sound from various types of ceiling surfaces and show that satisfactory effects are obtained except when the radius of curvature is nearly equal to the ceiling height.

Curved side walls are more likely to produce trouble than curved ceilings, because they are nearer the auditors. This is understood by referring again to Fig. 4 and imagining that the curved surface is now a side wall. Auditors in the position at 0 will get an undue concentration of sound. Similarly in Fig. 2, with a speaker at some distance from the wall, the sound will be focused for some auditors. If it is desired to make the general shape of a room circular, the side walls may be made the plane sides of an octagon or some other geometrical figure rather than keep them circular.

Sometimes echoes are set up by two or more reflections from walls. Fig. 5 illustrates such a case where sound from the speaker is focused by a side wall of double curvature and then spreads out only to be focused again by a second curved wall that produces an echo.

The third important feature in acoustic design concerns the amount of sound absorbent needed for good results. The lack of proper adjustment of this feature is the most common cause of defective acoustics. After a sound has made its impression on the auditors, it should die out rapidly enough to leave the field free for succeeding sounds, a condition that requires the presence in the room of a calculated amount of absorbing material.

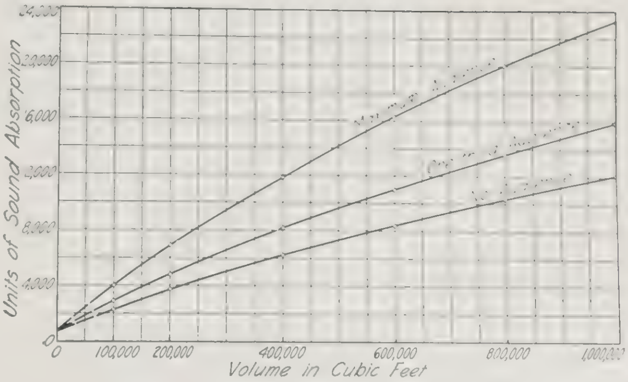


Fig. 7. Showing sound-absorbing material needed for a particular volume

Consider now the application of these three essential factors to the acoustic correction of an actual church auditorium of 242,000 cubic feet volume and seating capacity of 700.* The volume is such that the room will be satisfactory for usual speaking and music, but the sound of a brass band will be overpowering in its loudness, and a weak-voiced speaker can be heard only with difficulty. The ceiling walls, shown in Fig. 6, are curved with the radius almost equal to the ceiling height. Sound proceeding from the speaker to one of these walls is reflected, brought to a line focus, and then spreads out so as to cover an elliptical area of the floor. Sound striking farther back on this wall is reflected to the rear wall and from there back to the floor. Both of these echoes were quite marked. The other surfaces in the room were plane and produced no particular trouble which interfered with the acoustics.

The amount of sound-absorbing material needed was calculated by means of a formula and table of absorbing coefficients. The calculations are not repeated here, but a more direct solution is given by means of a curve, Fig. 7, which gives the amount of absorbing material needed for auditoriums of different volumes. The data for this curve have been collected for a number of years by the writer from auditoriums with satisfactory acoustics. For the volume in question, 5,500 units of material are needed when one-third of the capacity audience is present. Data concerning the absorbing material in

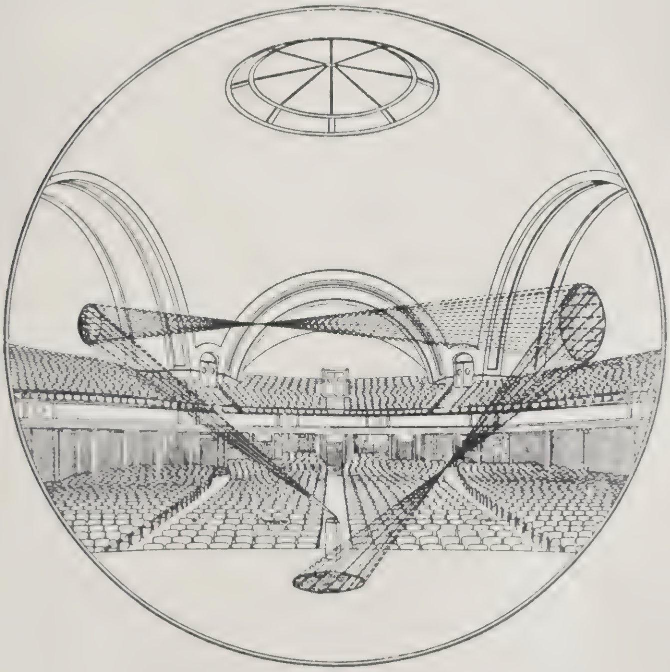


Fig. 5. Two reflections from curved walls, resulting in strong echo

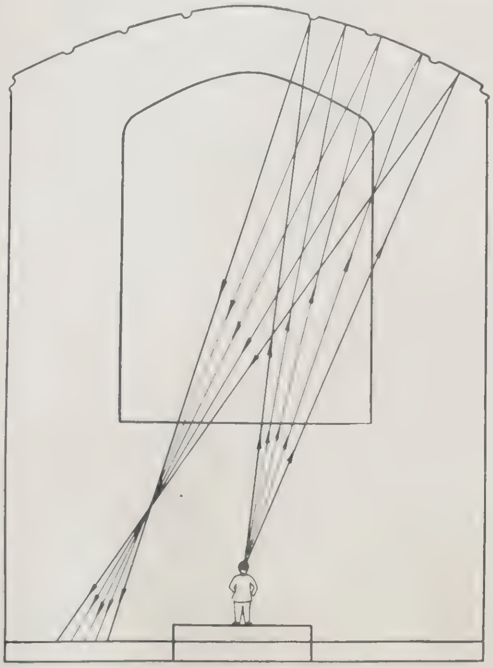


Fig. 6. Reflection of sound from a church auditorium ceiling. Echo formed

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*See book on "Acoustics of Buildings," in which calculations are given in detail for a number of auditoriums.

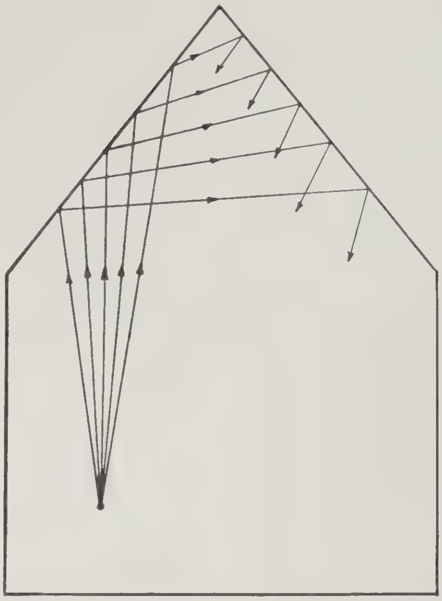


Fig. 8. Diagram of Gothic ceiling showing double absorption. Small chance for echoes

the room are given in the tabulation included here.* It is seen that with the one-third audience, only 1,974 units are available and that there must be added the difference between this number and 5,500 units to give the desired effect.

It remained to decide the kind of material and best positions for installation. After a study of the problem it was recommended:

1. That hair felt, 2 inches thick, be placed in the ceiling coffers. This served to absorb sound and to assist in breaking up echoes. Sound waves on striking the felt are partly absorbed and changed in phase on reflection compared with the waves reflected from the surrounding woodwork, thus producing interference which influences the acoustics.

2. Either that cushions be placed in the seats or that a carpet be laid on the floor.

3. That a number of curtains or tapestries be hung in front of the stone side walls.

The installation of materials as recommended would serve to reduce the echoes and to give an acceptable time of reverberation. A word or two might be added about materials for acoustic treatment. There appears to be a satisfactory movement at the present time to produce suitable products, and there are now available or in the process of development several different articles. Absorption may also be arranged by installing grilles in the surfaces of an auditorium through which sound may pass. These grilles eliminate reflection and reduce echoes in critical cases, but they should be backed by spaces containing absorbing material.

Consider now certain types of church auditoriums that have special features. Take the case of a cathedral. The size of the cathedral nave is usually so great that the voice of an ordinary speaker is practically lost, and the resultant sound is not loud enough for easy hearing. Music, on the other hand, is more satisfactory because of its greater energy. The ceiling areas are likely to be curved, but they are usually so high above the floor that the concentration of sound will not affect the hearers. It is quite likely, though, that echoes will be set up by more than one reflection of sound, so that a special geometrical study of the walls should be made to anticipate any marked defects. The plan of the area, usually in the form of a cross, limits the possibilities for locating a speaker and congregation for convenient hearing. An elevated pulpit and a sounding board of suitable shape may aid the speaker to some extent by reflecting his speech as directly and effectively as possible to the auditors, but the conditions are not nearly as advantageous as in a smaller interior with a controlled shape.

Christian Science churches furnish a particular form of auditorium which is usually circular in horizontal cross-section, with a dome. Speaking takes place not only from the platform but also by members of the congregation from any point on the floor. This produces conditions very likely to form echoes, because the curved side walls and the dome concentrate the reflected sounds. An effective safeguard would be to use a flattened dome surface with the radius of curvature more than twice the ceiling height. The curved effect is thus maintained and may be accentuated by circular rows of coffers. The focusing effect of the side walls may be reduced either by hanging curtains in front of them or by making them plane surfaces which will be sections of a hexagon or other regular figure. Part of the absorbing materials needed to reduce the reverberation should be placed on the ceiling surface. Other details of arrangement would be decided after a study of the auditorium in question.

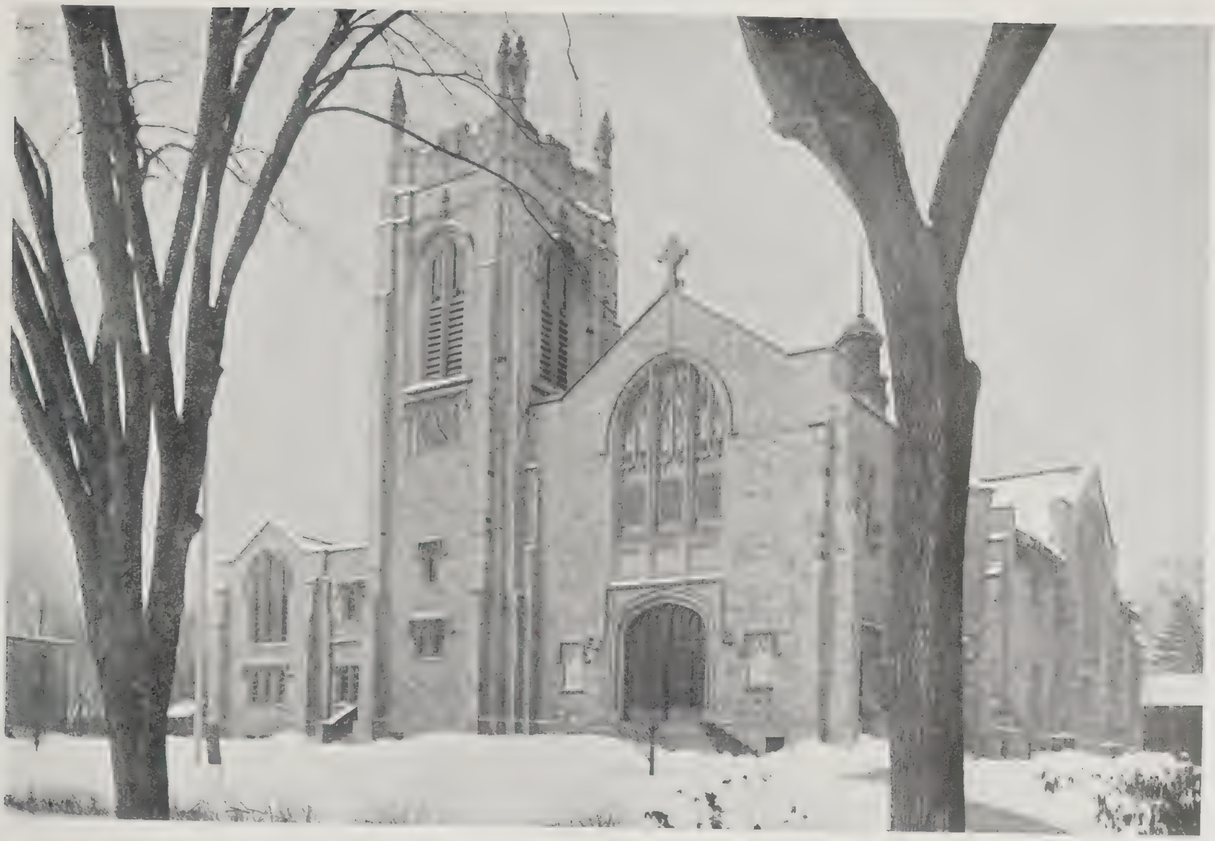
Gothic ceilings usually produce good acoustic effects. Sound carries easily from the pulpit to the rear of the church. Installing absorbing material on the ceiling surfaces reduces possibilities of echoes and acts as an effective absorbent. See Fig. 8. Street noises are sometimes objectionable, and these may be avoided to some extent by means of an entrance lobby quieted by absorbing material. Outside disturbances are then prevented from reaching the auditors, first by the outside doors, then by the quiet lobby, and finally by the swinging doors to the auditorium. Upholstered seats or pew cushions have the advantage that they make the space partly independent of the congregation. Auditors absorb much sound because of the clothing worn. On occupying seats, they substitute the absorption of their clothing for that of the cushions or upholstery, and thus tend to keep the absorption of sound constant. Music or speaking in such a room is much the same whether a congregation is present or not.

---

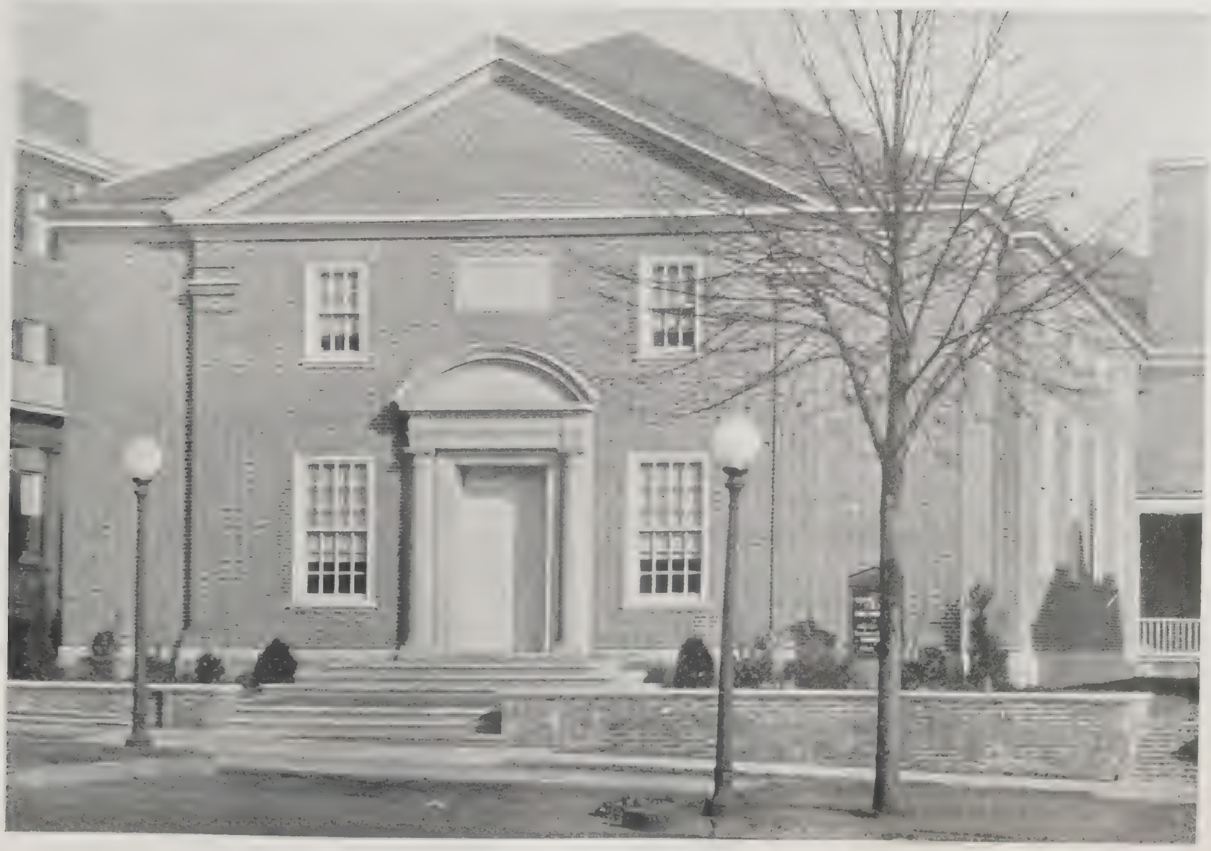
*

| Material | Area | Coefficient | Total Units |
|---|---|---|---|
| Cork floor .......... | 4560 sq. ft. | × .03 | = 137. |
| Stone walls ........ | 9360 " " | × .019 | = 178. |
| Glass windows ..... | 4465 " " | × .025 | = 112. |
| Woodwork ......... | 5679 " " | × .061 | = 346. |
| Plaster ............. | 2057 " " | × .025 | = 51. |
| Seats .............. | 700 " " | × .1 | = 70. |
| | | a = total units, empty auditorium | 894. |

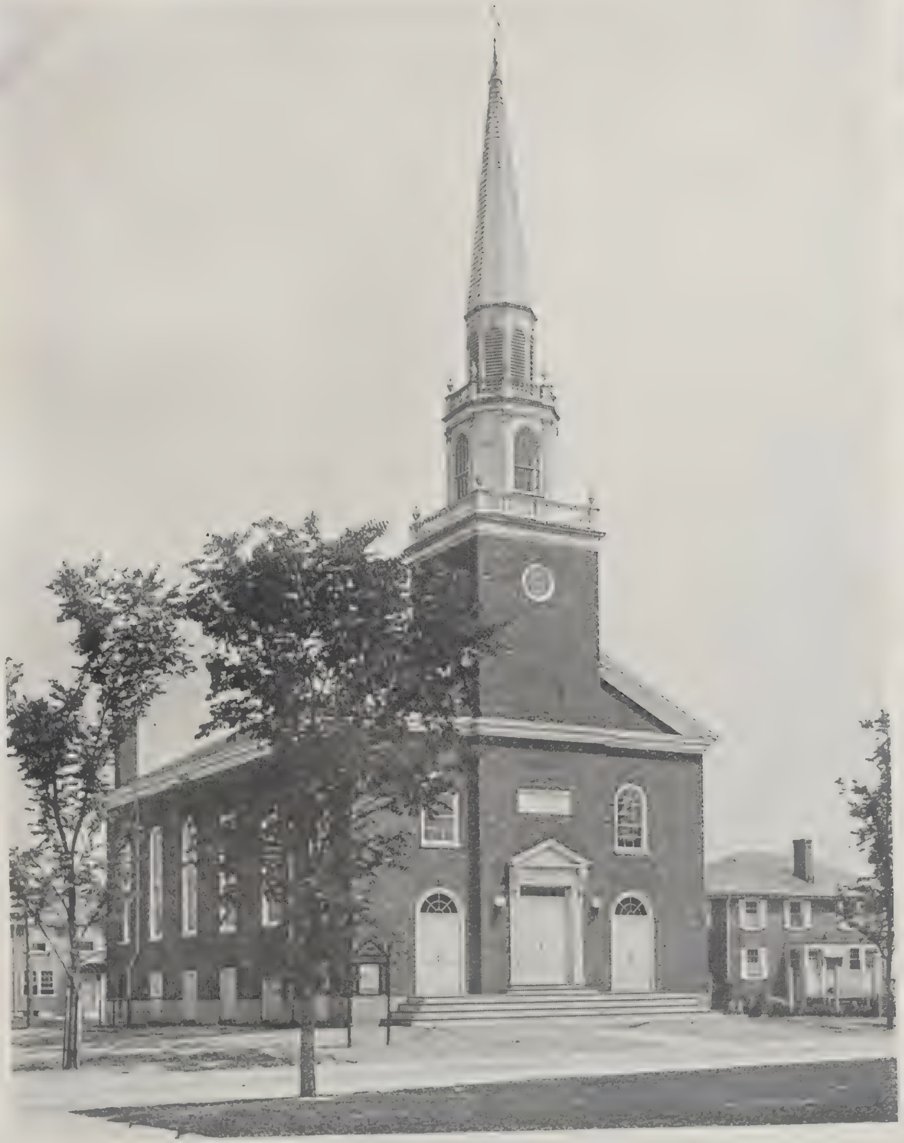
235 auditors ( 1/3 audience) × 4.6 = 1080 + 894 = 1974
700 auditors (max. audience) × 4.6 = 3220 + 894 = 4114



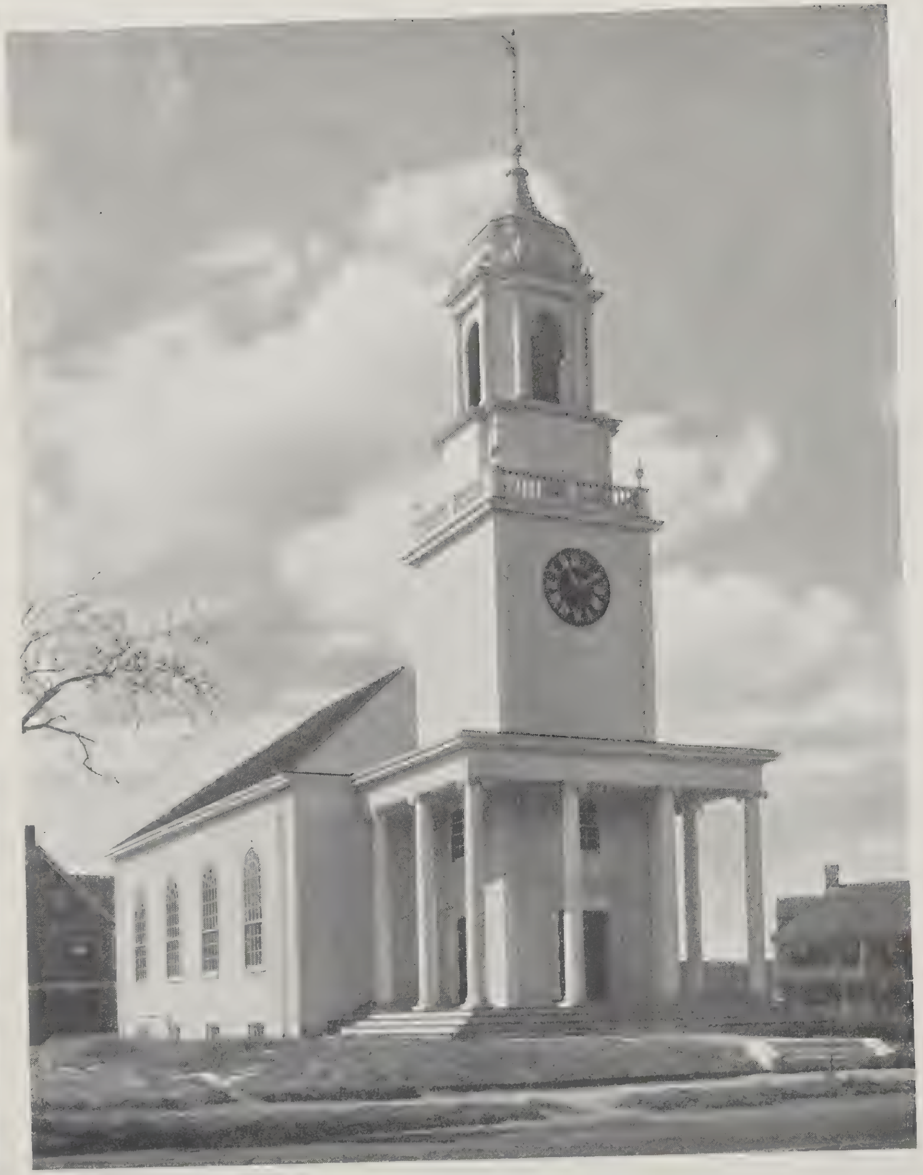
FIRST M. E. CHURCH, WESTFIELD, N. J.
J. F. JACKSON, ARCHITECT



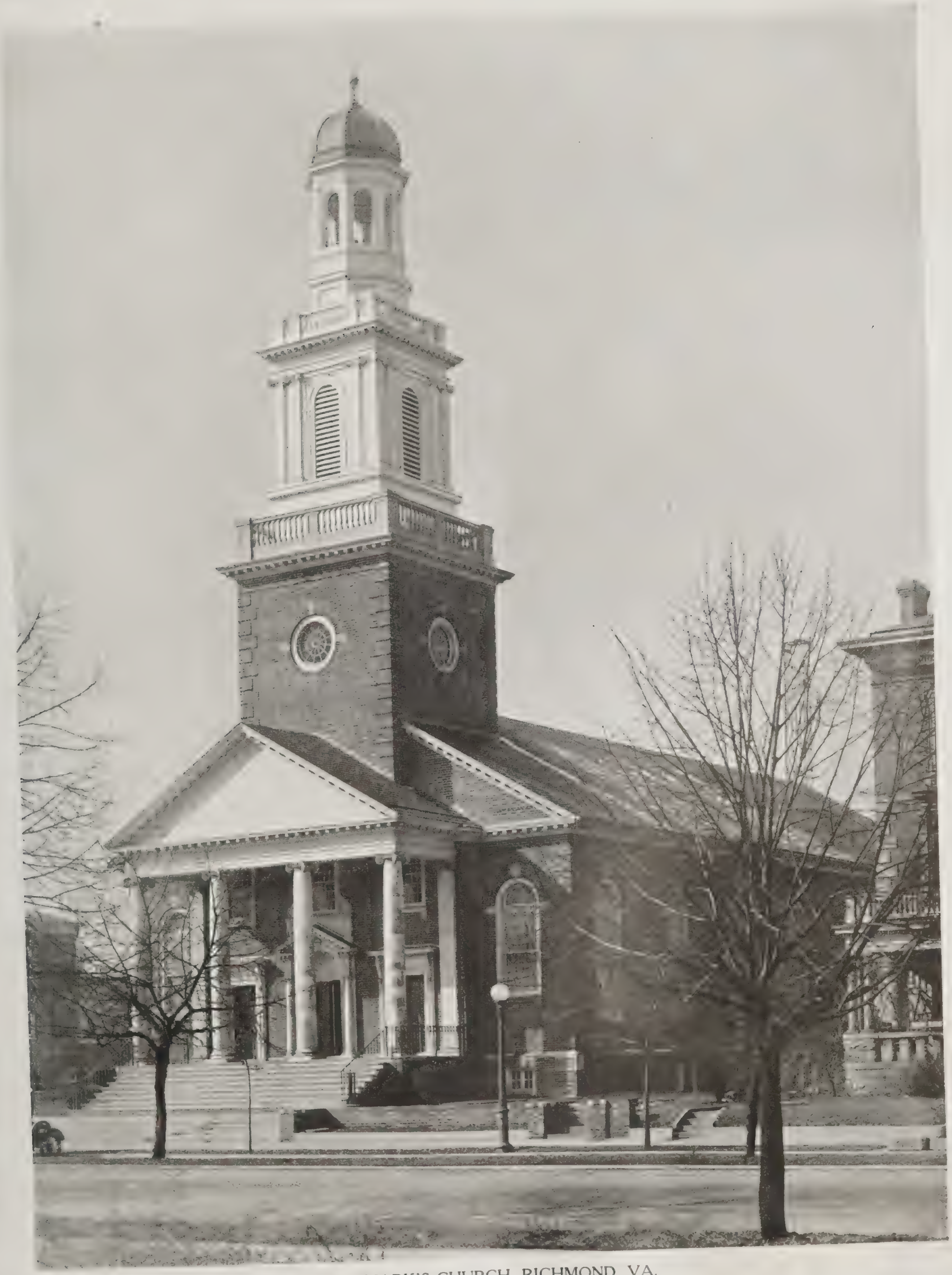
FRIENDS' MEETING HOUSE, BALTIMORE
EDWARD L. PALMER, JR., ARCHITECT



BAPTIST CHURCH, YORKSHIP VILLAGE, N. J.
ELECTUS D. LITCHFIELD & ROGERS, ARCHITECTS

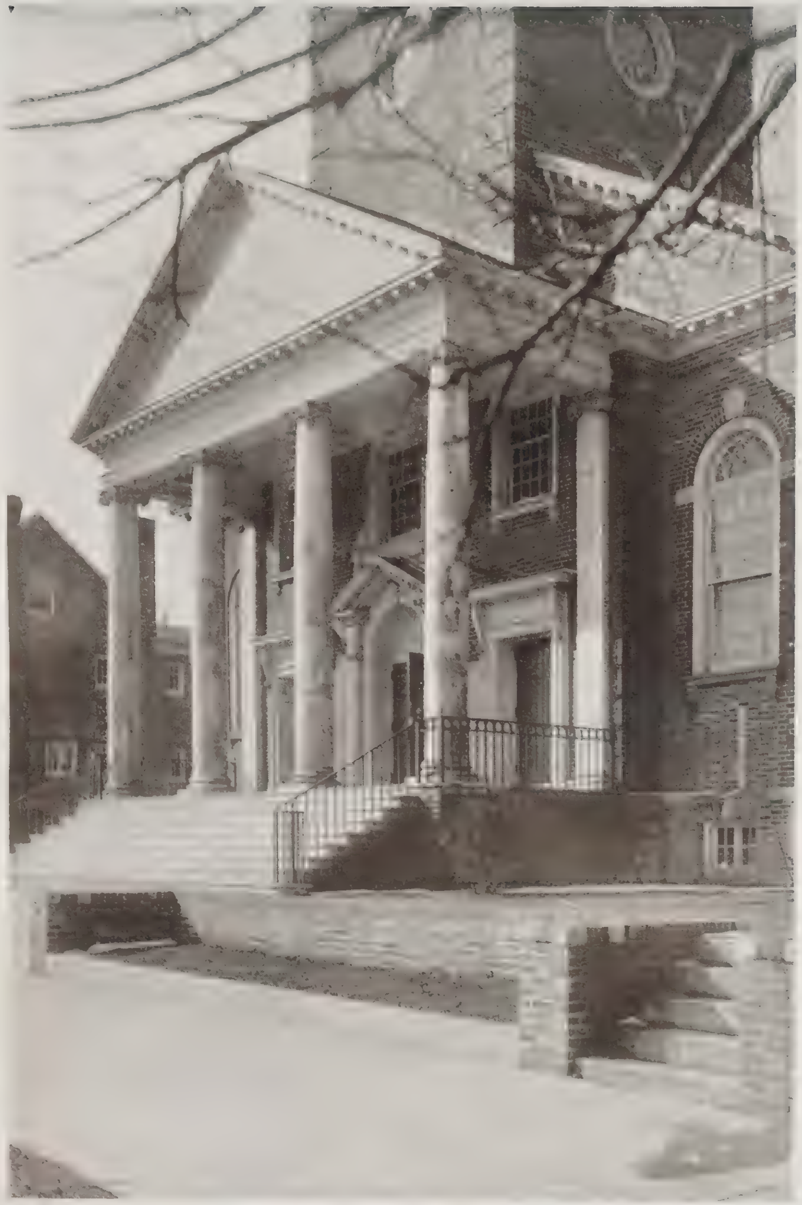


CALVARY M. E. CHURCH, ARLINGTON, MASS.
JAMES H. MAC NAUGHTON, ARCHITECT

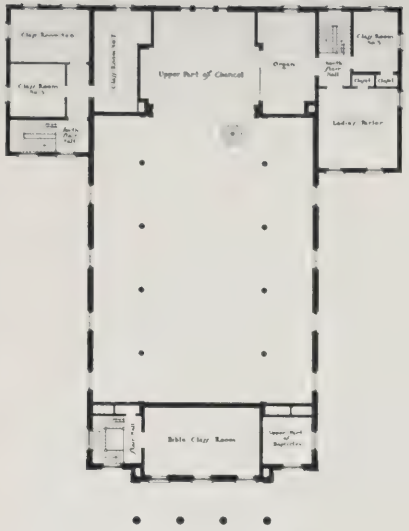


ST. MARK'S CHURCH, RICHMOND, VA.
BASKERVILLE & LAMBERT, ARCHITECTS

*Photos. Tebbs*



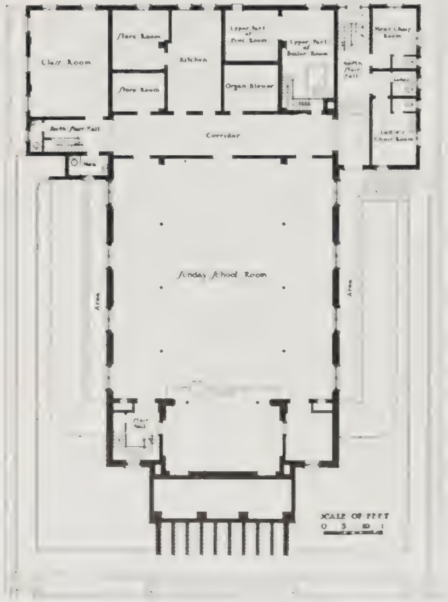
VIEW OF ENTRANCE PORTICO



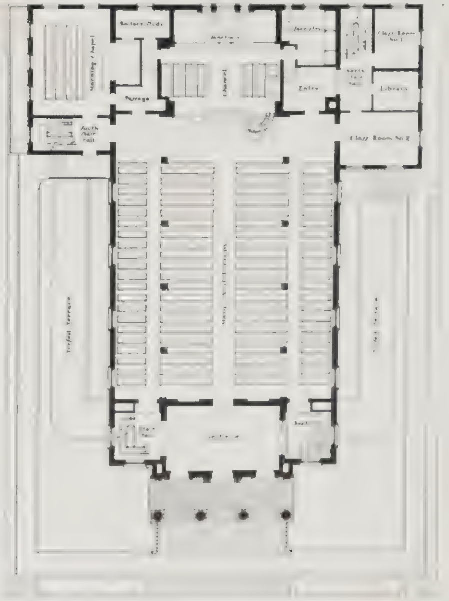
SECOND FLOOR PLAN

PLANNING of this church was done in the spirit of the later and more luxurious of the Colonial churches, a number of which still exist in the older cities of the Atlantic seaboard.

The plan is similar to that of several of the earlier churches,—nave divided from aisles by columns which support the ceiling, flat over the aisles and barrel vaulted over the nave. Detail of the interior is somewhat richer than that used without and is of wood, painted excepting for such details as the pews and the handrail to the pulpit which are mahogany in natural finish. As is correct in a church of this type the windows are filled not with stained or painted glass but with glass which is clear or transparent and in fairly small panes. The Colonial character of the interior is considerably heightened by the use of a Palladian window above the altar and of a suspended sounding-board over the pulpit. Here the Sunday School department is in a well lighted basement, with some of the classrooms on the main floor.

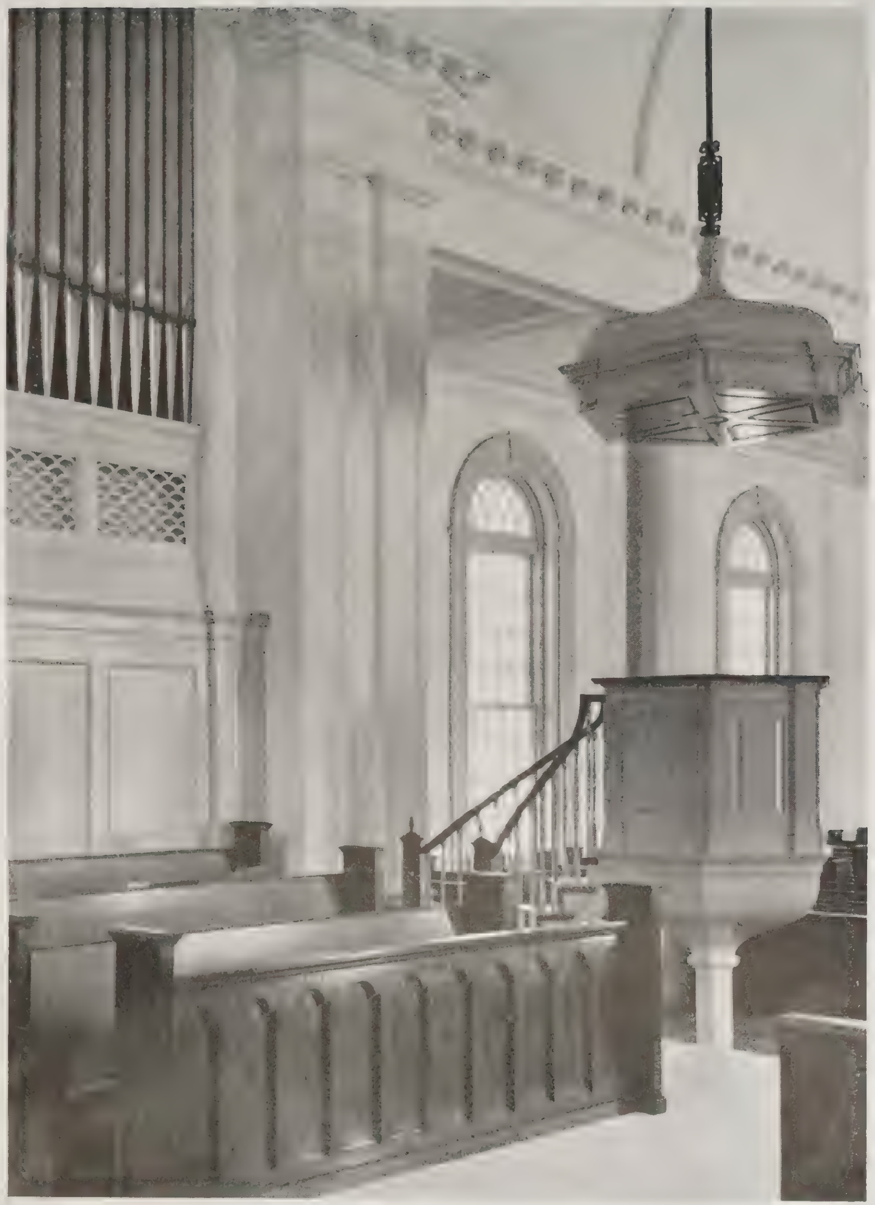


BASEMENT PLAN

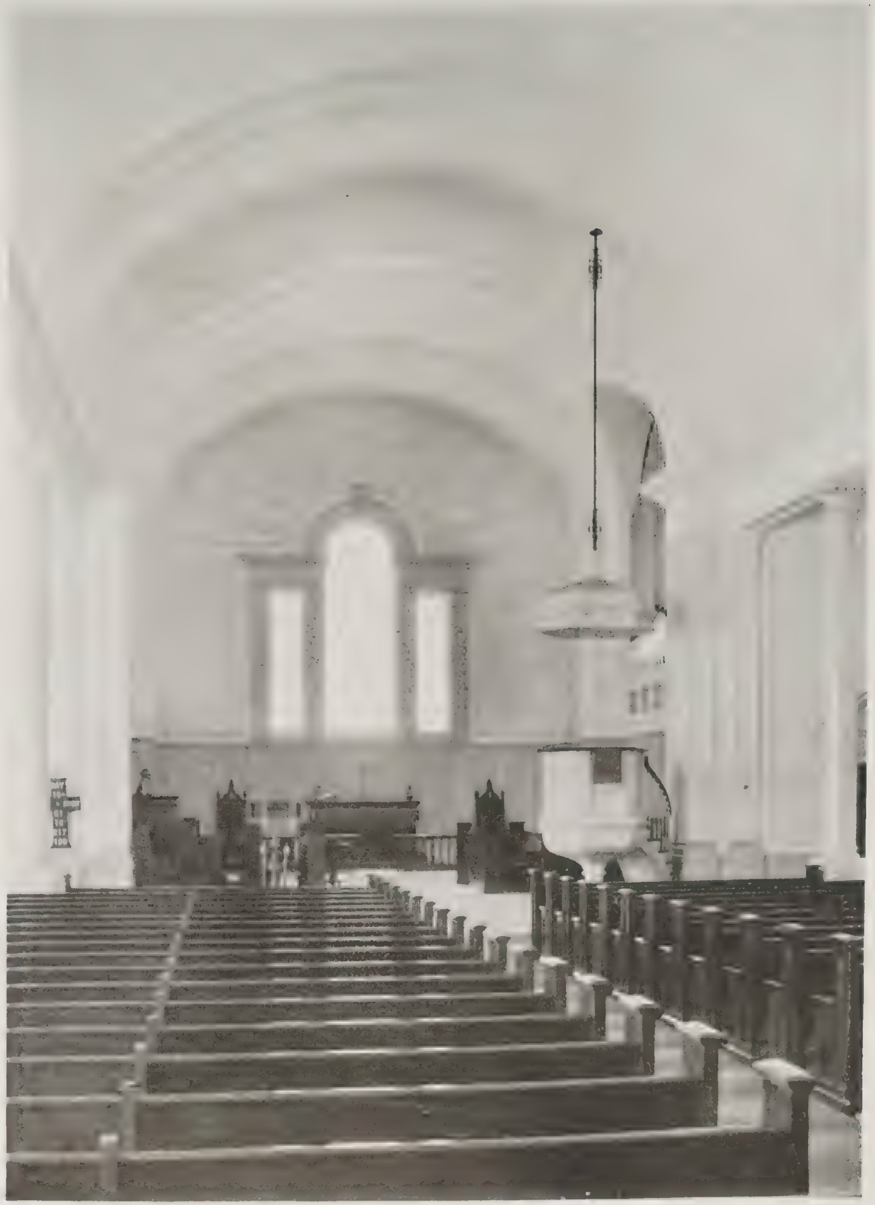


MAIN FLOOR PLAN

ST. MARK'S CHURCH, RICHMOND, VA.
BASKERVILLE & LAMBERT, ARCHITECTS

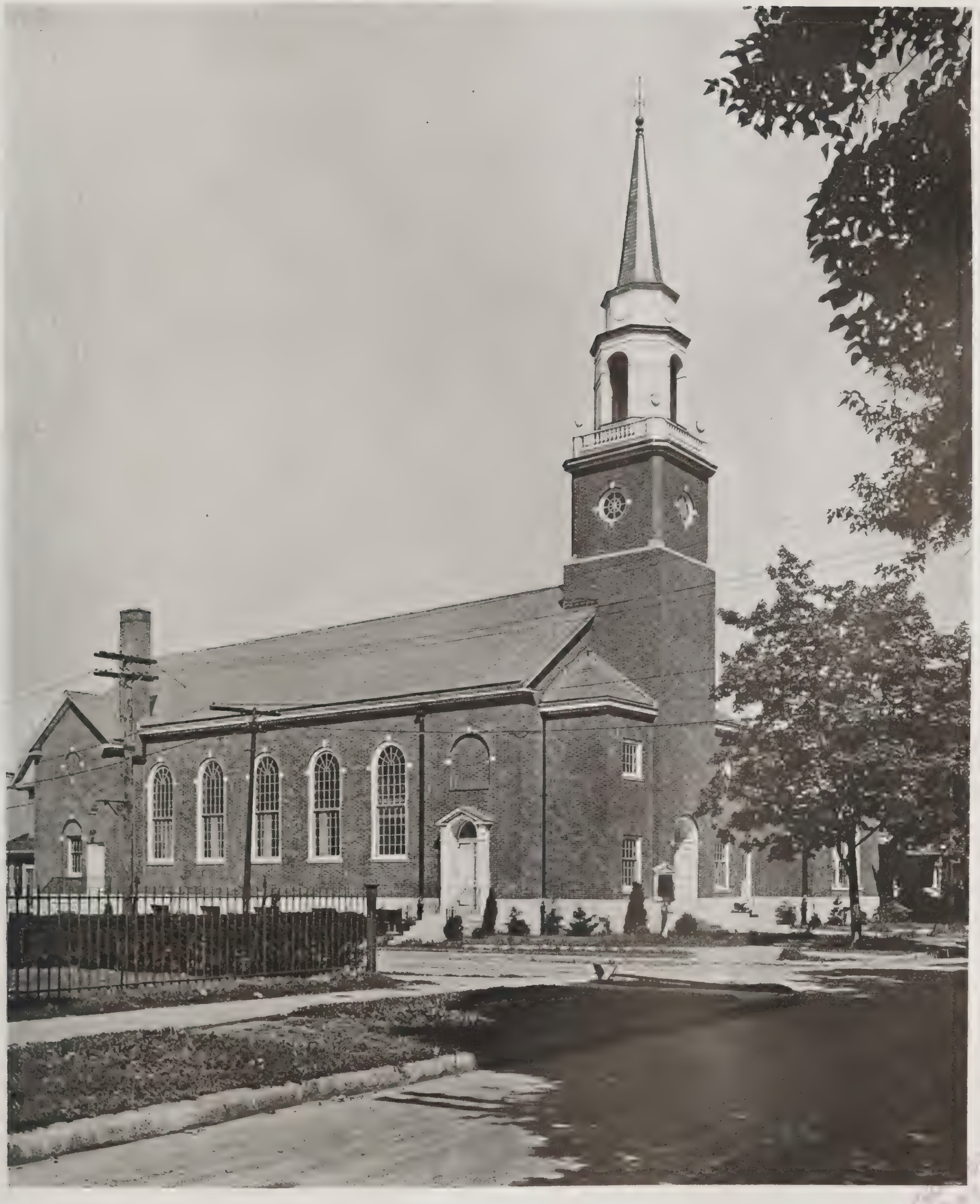


VIEW OF CHOIR AND PULPIT



INTERIOR, LOOKING TOWARD SANCTUARY

ST. MARK'S CHURCH, RICHMOND, VA.
BASKERVILLE & LAMBERT, ARCHITECTS

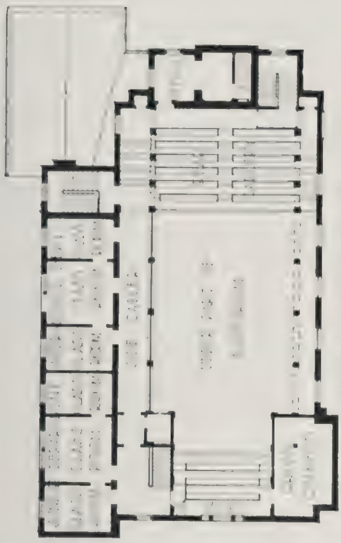


THE design of this building was based on Colonial tradition, but adapted to the needs of a present-day Baptist congregation requiring considerable equipment for educational and social purposes. Main auditorium used for general assembly of Sunday School; classrooms opening from auditorium for individual instruction. Readily accessible from narthex are rooms for a men's club, a large room for meetings and dinners, a room for boys, and shower baths and bowling alleys. Exterior of building brick and limestone, with trimming of wood, painted. Cost of building $96,000 or about 32 cents per cubic foot.

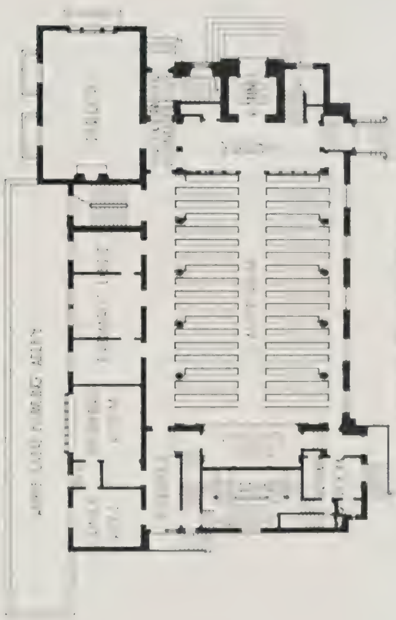
FIRST BAPTIST CHURCH, JAMAICA, N. Y.

JOSEPH HUDNUT, ARCHITECT; W. E. MANHART, ASSOCIATE

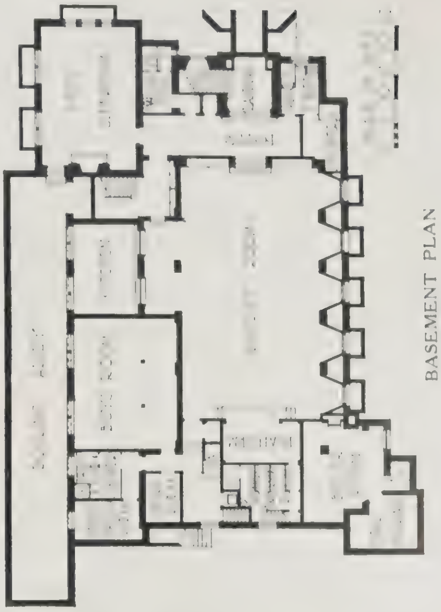
*Photos. John Wallace Gillies*



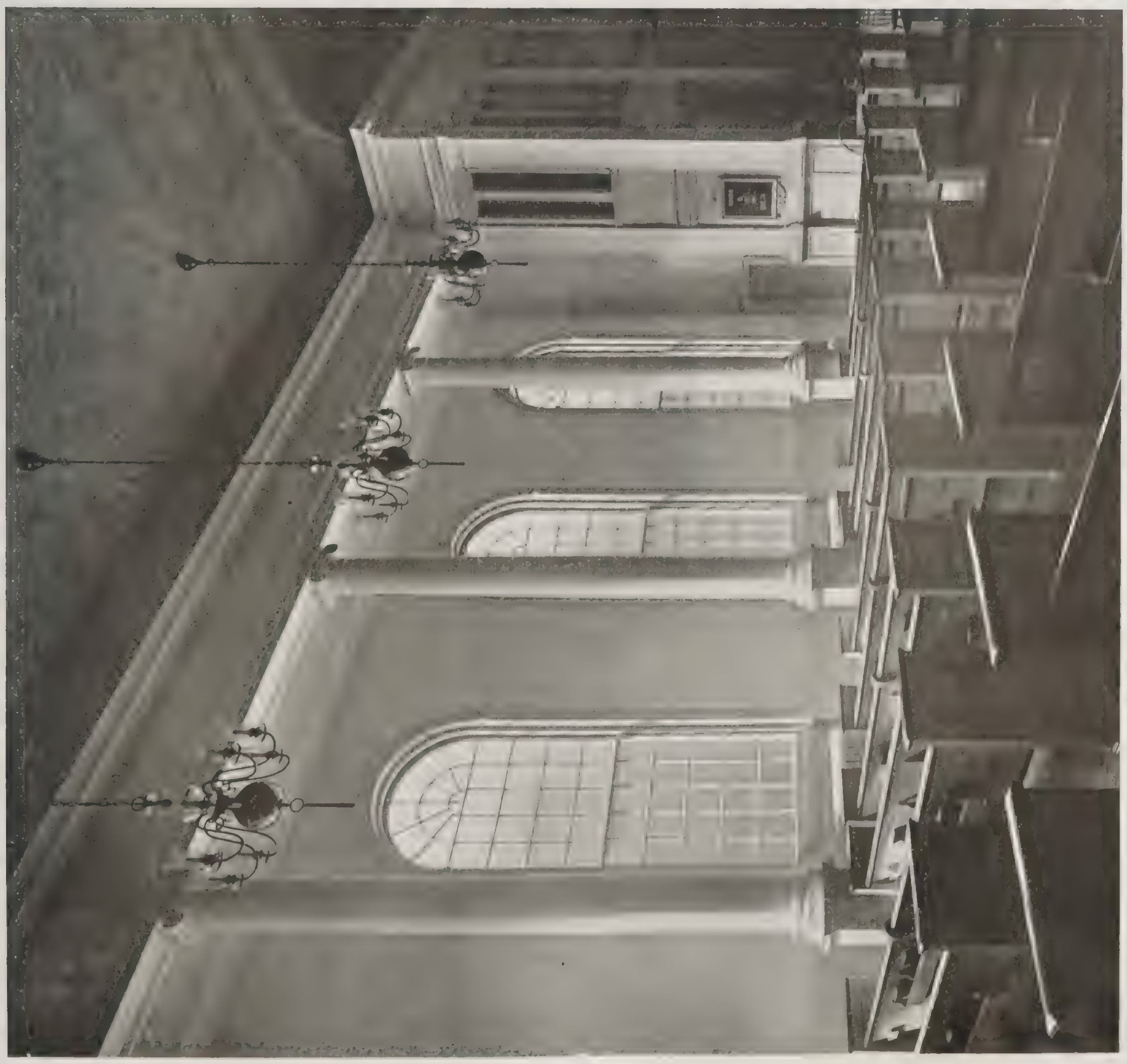
SECOND FLOOR PLAN



MAIN FLOOR PLAN



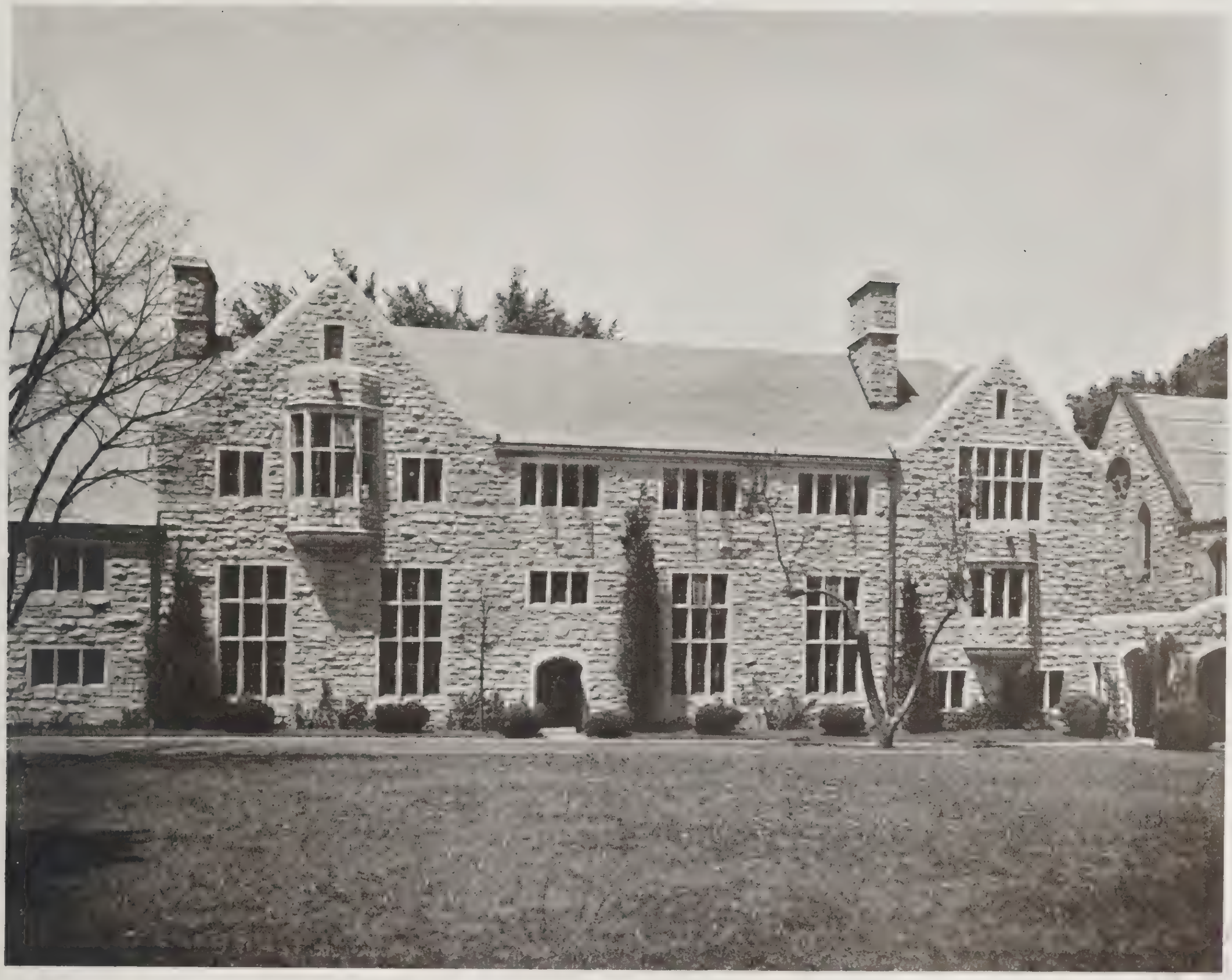
BASEMENT PLAN



VIEW OF NORTH AISLE

FIRST BAPTIST CHURCH, JAMAICA, N. Y.

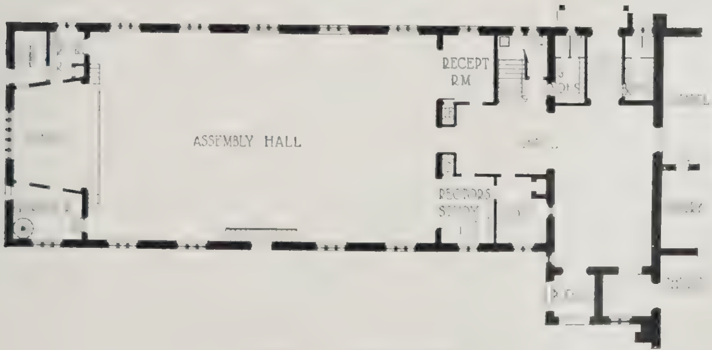
JOSEPH HUDNUT, ARCHITECT; W. E. MANHART, ASSOCIATE



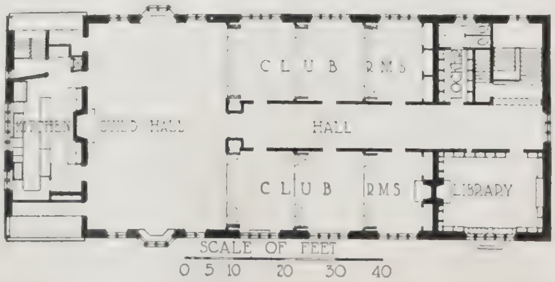
GENERAL VIEW OF BUILDING

THE material used for the exterior of this building as well as its general style was determined by the necessity of securing architectural agreement between the existing church building and the newer structure which adjoins. It was desired that the church house supply facilities for parish work of a somewhat broad and varied nature, with ample equipment for the meetings of guilds and also for activities which are likely to involve the participation of large numbers of people.

All of these activities have been provided for; the upper floor of the church house contains two suites of three club rooms each, which on occasion are easily made into one large room, while both of the suites open into a large guild hall which is provided with kitchen and serving pantry. Upon the ground floor there is a spacious assembly room with an entrance directly from without as well as from the hall between the church and the church house. This assembly hall is equipped with every convenience, including stage and dressing rooms. The building also makes provision for a parish library, and what is particularly to be noted is the suite of offices in the church house for the rector or the members of his staff who supervise its activities. The interiors are dignified while possessing at the same time an appropriately domestic character, and finish is in keeping with the purposes of the building.



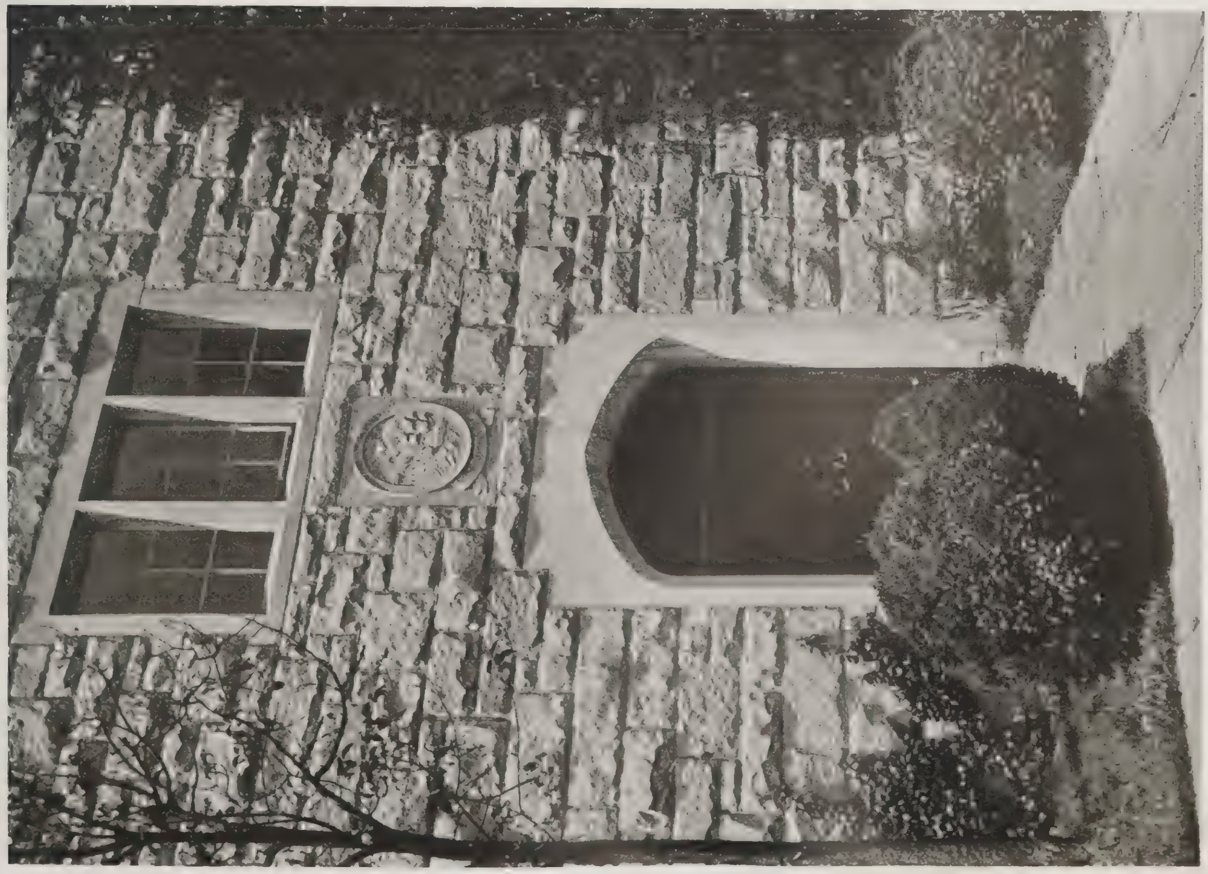
FIRST FLOOR PLAN



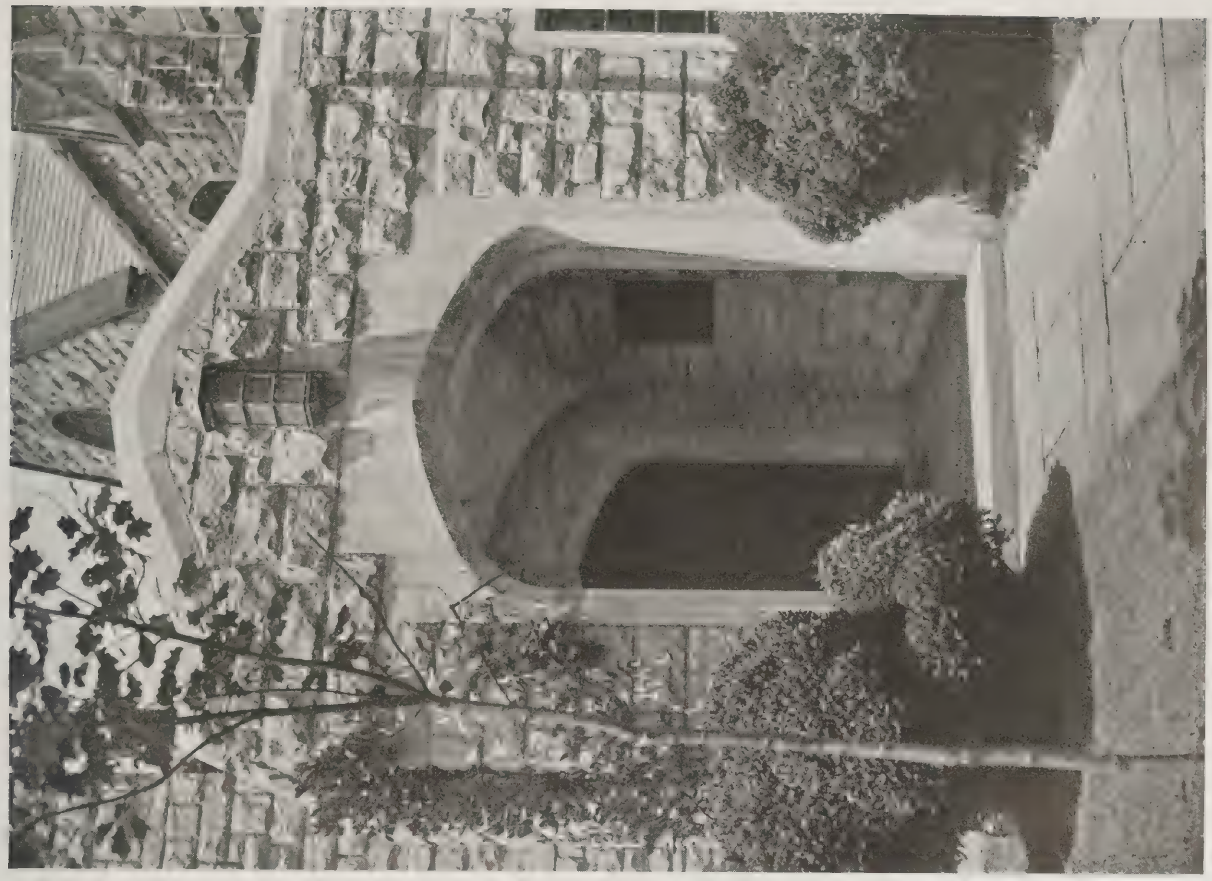
SECOND FLOOR PLAN

CHURCH HOUSE, ST. JOHN'S CHURCH, WATERBURY, CONN.

RICHARD H. DANA, JR., ARCHITECT



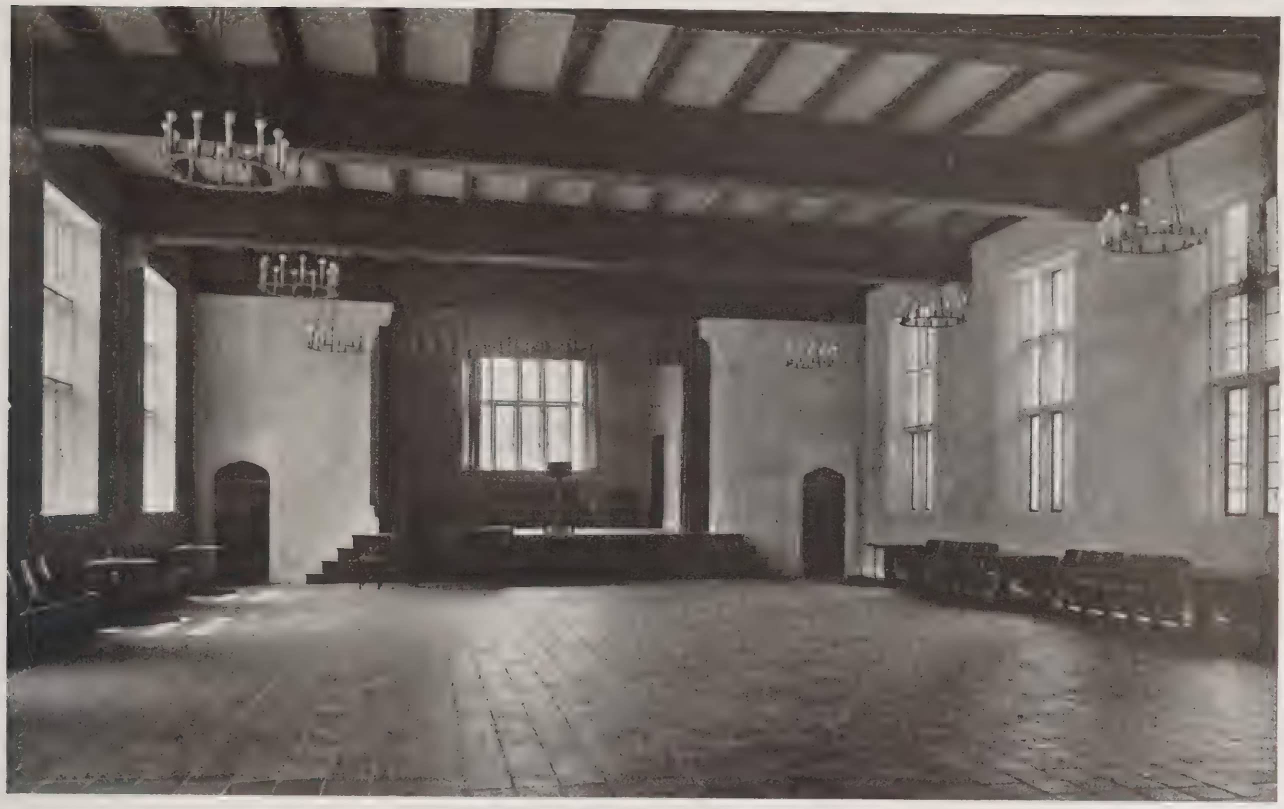
ENTRANCE TO ASSEMBLY HALL



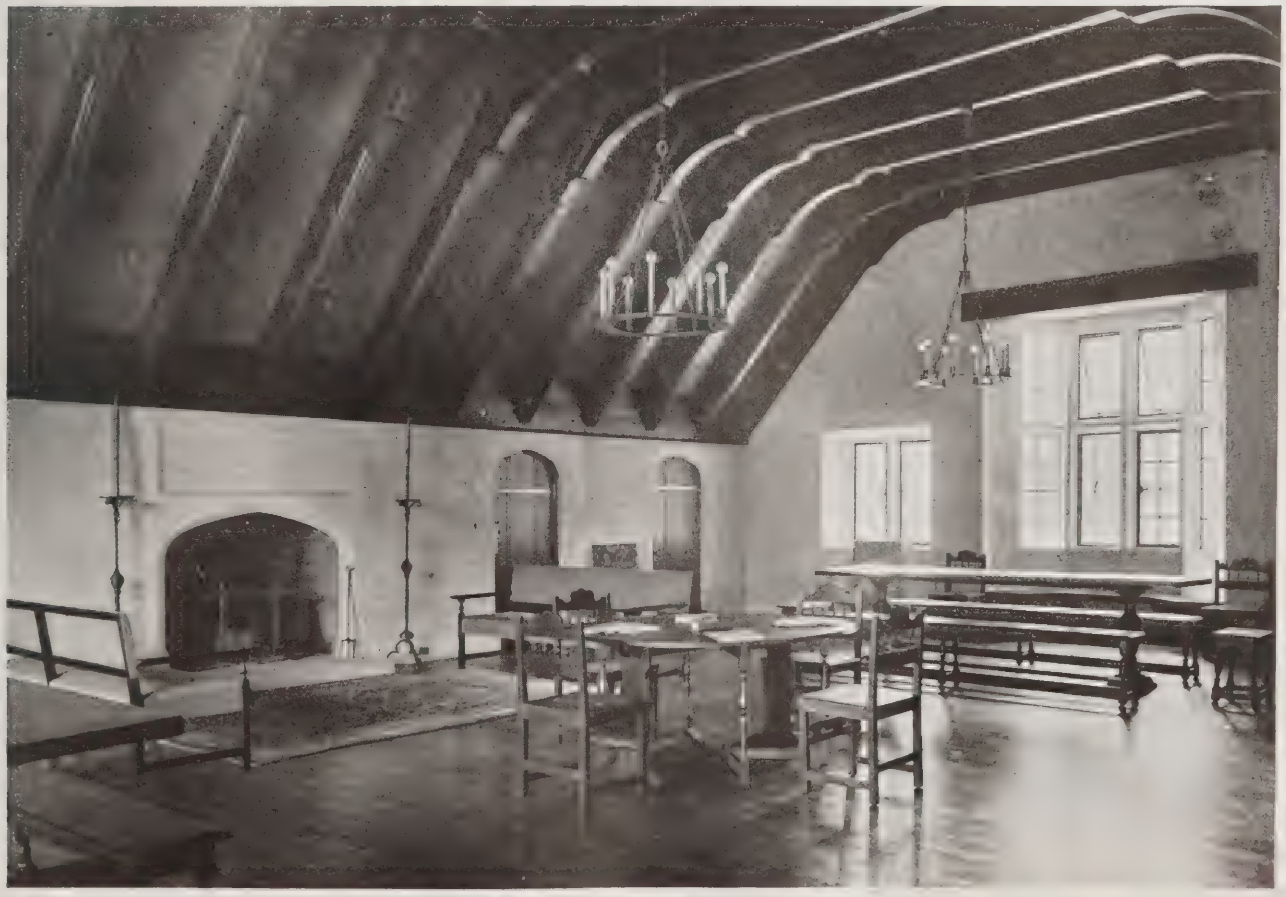
DETAIL OF MAIN ENTRANCE

CHURCH HOUSE, ST. JOHN'S CHURCH, WATERBURY, CONN.
RICHARD H. DANA, JR., ARCHITECT

*Photos. Kenneth Clark*



VIEW OF ASSEMBLY HALL, FACING STAGE



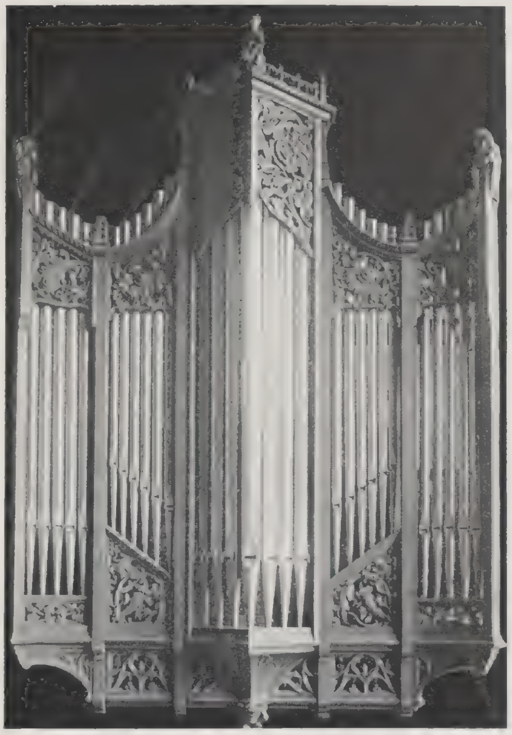
ONE END OF THE GUILD HALL

CHURCH HOUSE, ST. JOHN'S CHURCH, WATERBURY, CONN.

RICHARD H. DANA, JR., ARCHITECT

# Recent Altars and Other Accessories

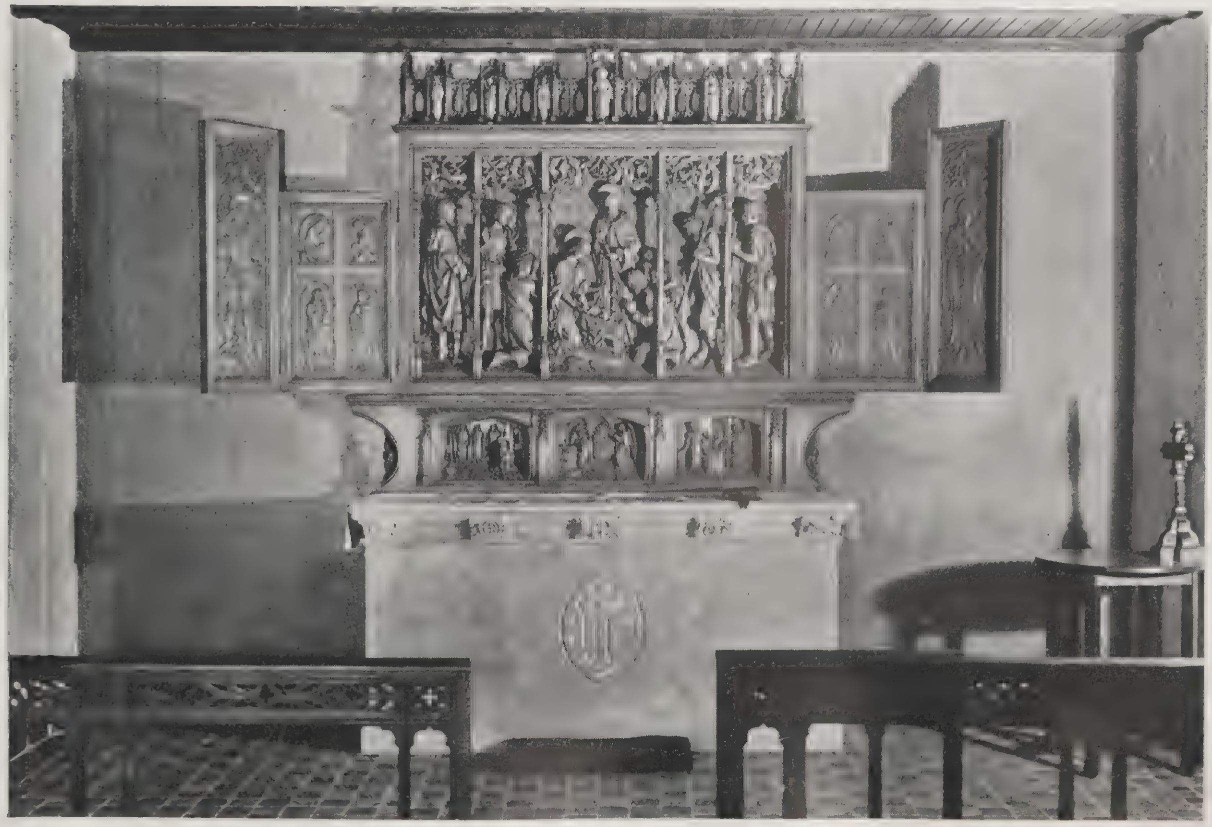
THE triumphs of Gothic art or of art in general, and particularly of architecture, cannot be said to belong exclusively to any one era or any one country. The mediæval period in Europe saw, it is true, a marvelous flowering of ecclesiastical art of every kind, but the flowering was not wholly spontaneous but was rather called into being by a demand for its masterpieces and by the encouragement which such a demand presupposed. The arts which serve religion were for almost a century to a great extent overlooked or ignored, but architects and workers in the various crafts are once more receiving encouragement and patronage which have led to a revival of these arts. While architects have been absorbed with study of design and structure, artisans of every kind have been acquiring anew the skill of the craftsmen of long ago and, stimulated by an ever-growing appreciation on the part of patrons, have already produced work which would have done credit to workers of earlier centuries and other lands. While preëminently true of stained glass, which demands discussion all its own, it is particularly true of such arts as metal working and carving, whether in stone or wood.



Organ Case, Emmanuel Church, Baltimore

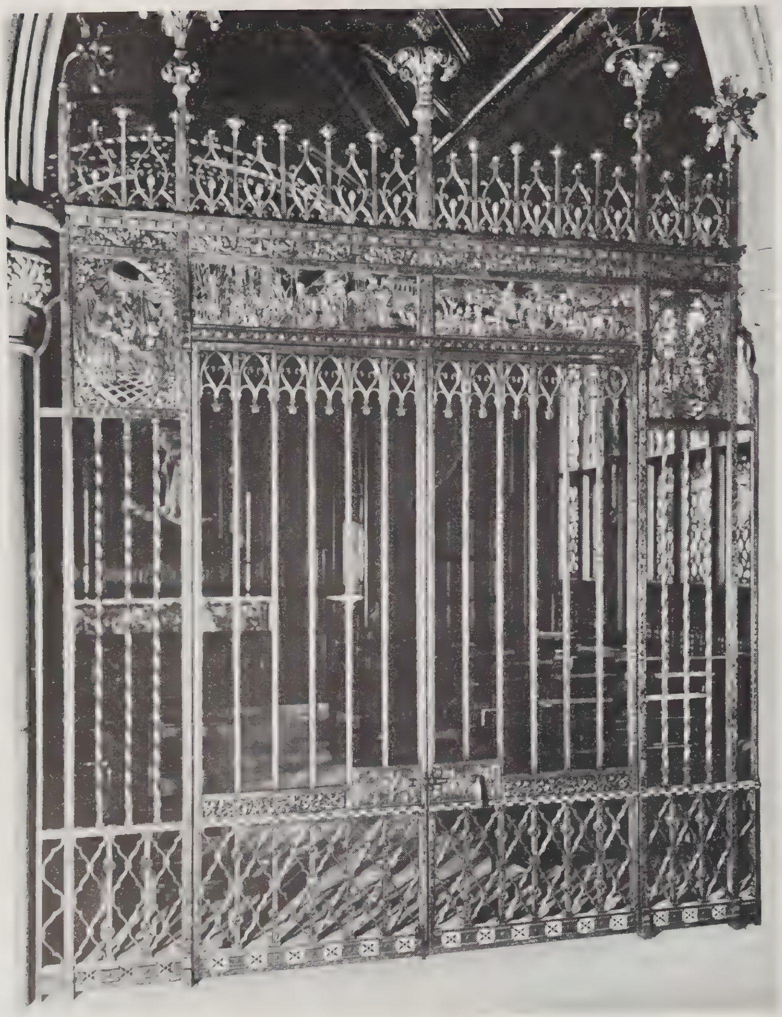
Woldemar H. Ritter, Architect

In and around New York, among many examples of excellent work which has been done within the past few years, there are several examples of church accessories in wood carving or metalwork which are notable. Among them are the triptych at St. Paul's, Flatbush, and



Altar in Chapel of Remembrance, Church of St. Michael and All Angels, Baltimore

Woldemar H. Ritter, Architect



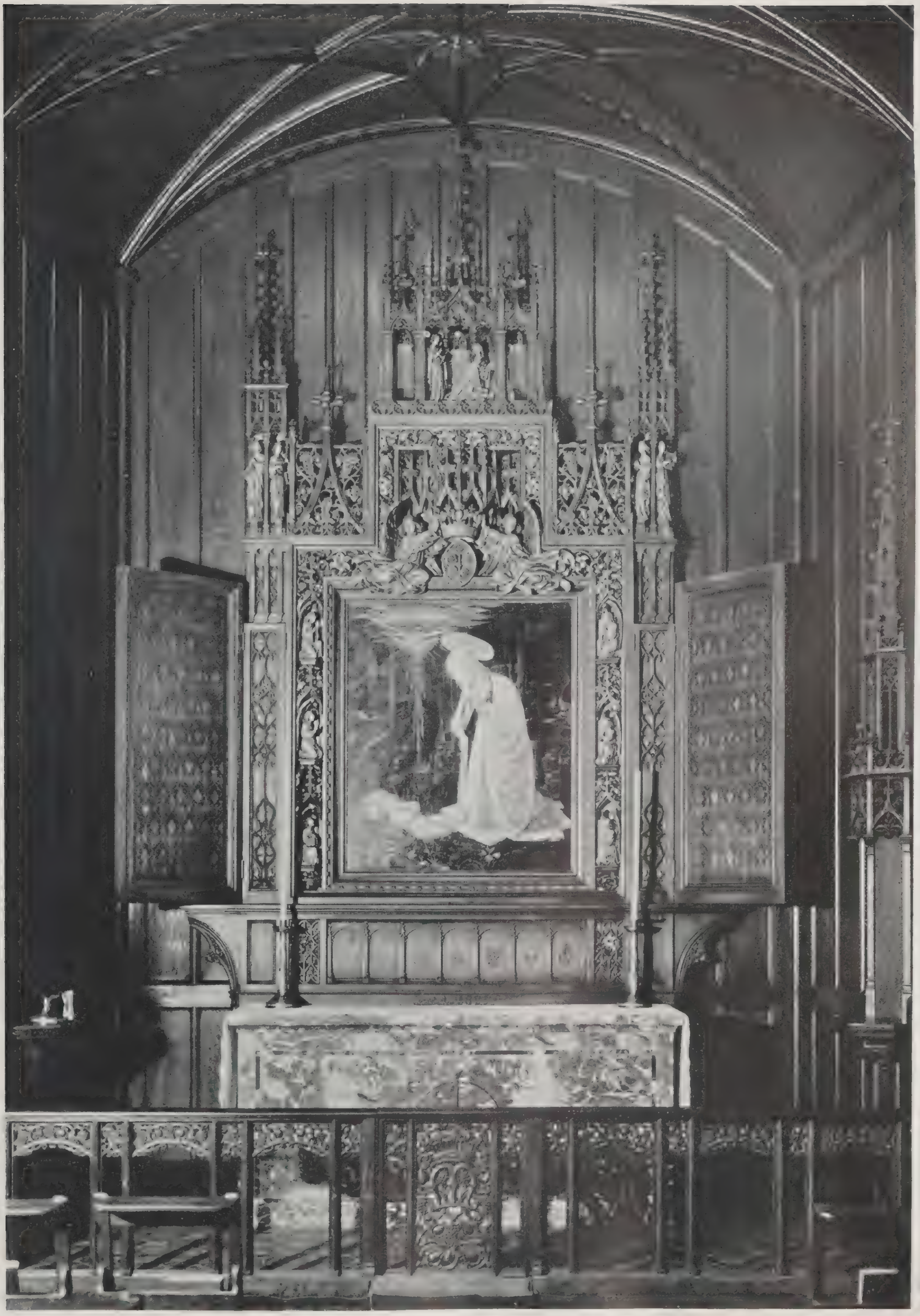
Iron Grille, Grace and St. Peter's Church, Baltimore
Woldemar H. Ritter, Architect

the arrangement of the main altar at St. Luke's Chapel, Hudson Street, of which Wilfred E. Anthony is architect. The triptych is a beautiful example of this ancient form of over-altar treatment, and its ornament of painting, carving, coloring and gilding is so disposed that when the triptych is closed, during the penitential seasons of Advent and Lent, it is only a little less rich and glorious than at other times when its full splendor is revealed. The altar at St. Luke's is arranged with a low reredos with riddels, the riddel posts being of a very correct and beautiful character and the hangings themselves laced to the supports in true Gothic fashion. The altar proper is admirably arranged, the cross and candlesticks resting directly on the *mensa,* and the altar covered with undecorated linen. Among the most notable examples of metalwork made within recent years are the grilles which divide several chapels from the nave at the Church of St. Vincent Ferrer, New York, of which Bertram Grosvenor Goodhue is architect, and the tabernacle of metal and enamel upon the high altar which was also designed in Mr. Goodhue's office.

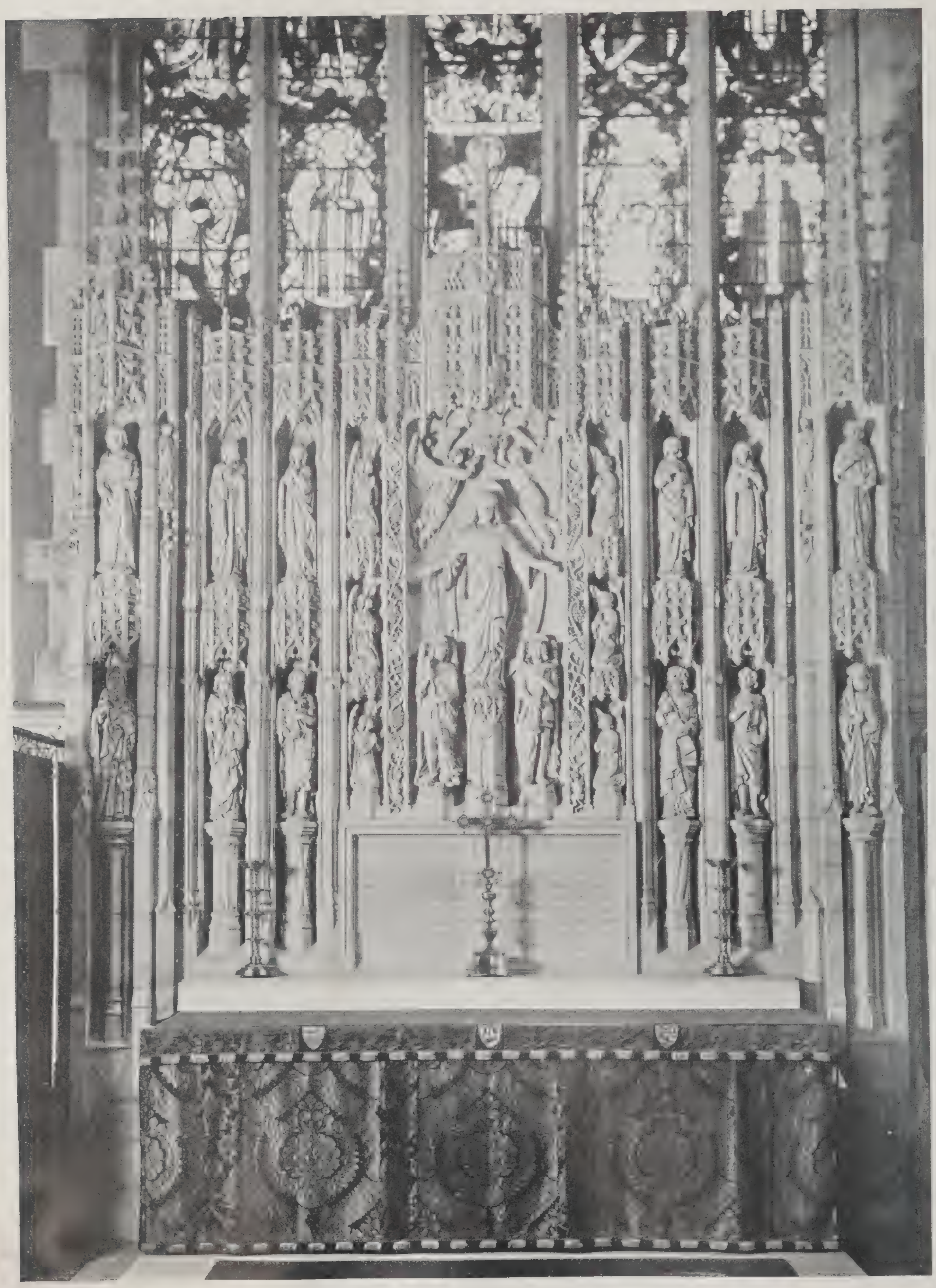
The altar at St. John's, Newport, of which Cram & Ferguson are architects, while already fairly well known, is included here because it ranks as a superlatively rich and beautiful example of craftsmanship of several

Sacristy, Emmanuel Church, Baltimore
Woldemar H. Ritter, Architect

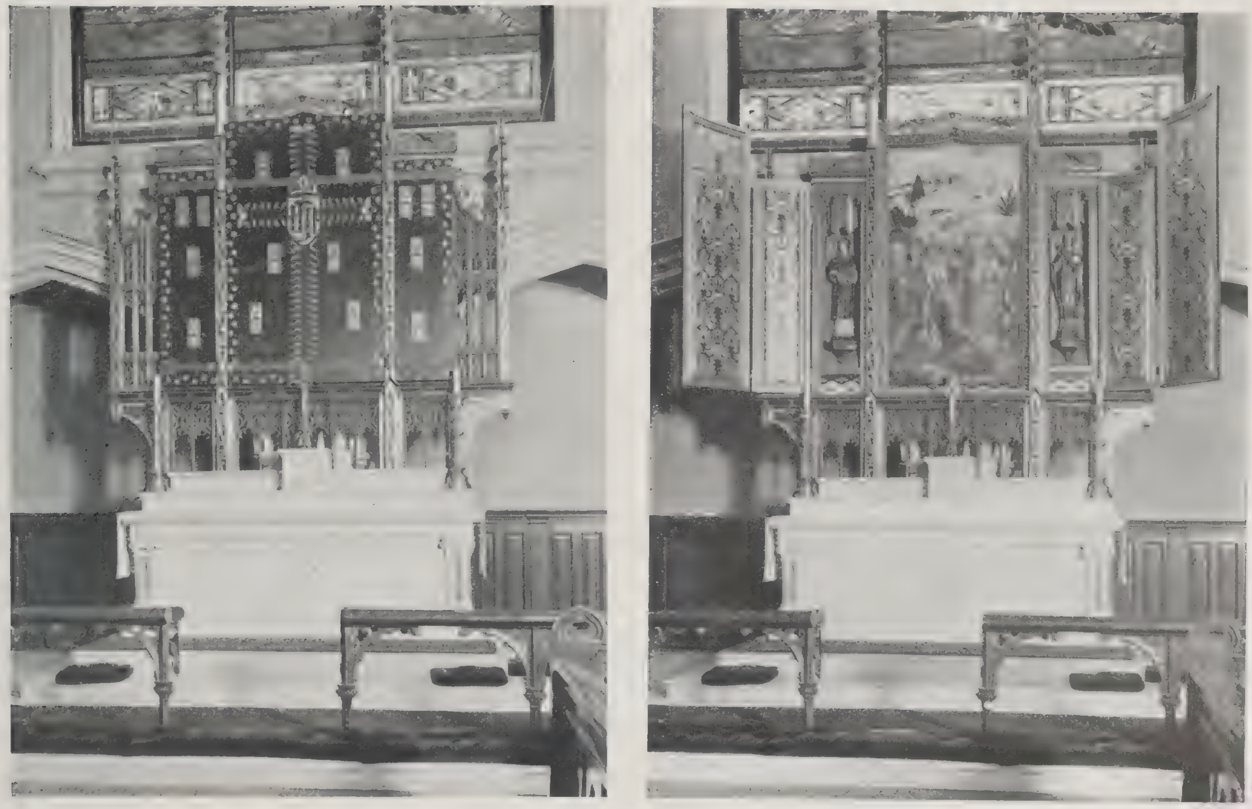
Memorial Tablet in Floor of Chapel
Woldemar H. Ritter, Architect



ALTAR AND REREDOS IN LADY CHAPEL, GRACE AND ST. PETER'S CHURCH, BALTIMORE
WOLDEMAR H. RITTER, ARCHITECT



ALTAR OF EMMANUEL CHURCH, BALTIMORE
WOLDEMAR H. RITTER, ARCHITECT



Triptych Closed During Advent and Lent

Wings Opened at Other Times

Altarpiece in Form of a Triptych, St. Paul's Church, Flatbush, New York

Wilfred E. Anthony, Architect

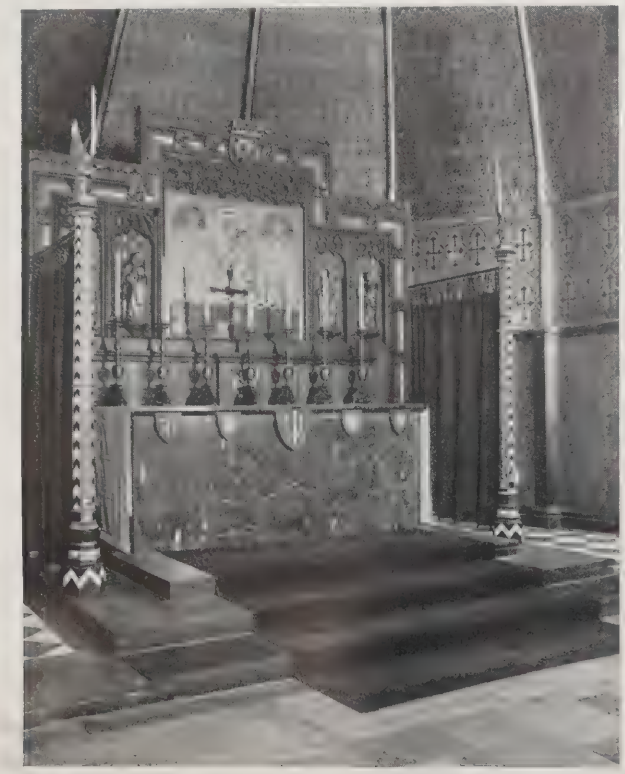
kinds. Its carving is among the best examples of modern work, and its tabernacle of metal and enamel is equal in importance to the carving which surrounds it. The painting is by a member of one of the religious orders of the Episcopal Church.

In Baltimore there are numerous examples of excellent craftsmanship designed by Woldemar H. Ritter, from which have been selected a few of the more important examples. The altar in the Chapel of Remembrance in the Church of St. Michael and All Angels is a splendid example of appreciation of carefully studied proportions. The relation of the mass of the plain, rectangular marble altar to the richly carved and ornamented triptych above is most successful. In the very low relief of the carved paneled doors of the triptych a pleasant contrast with the high relief of the carved Nativity is obtained, thus attracting the eye to the primary focal point of the whole composition as to its true center.

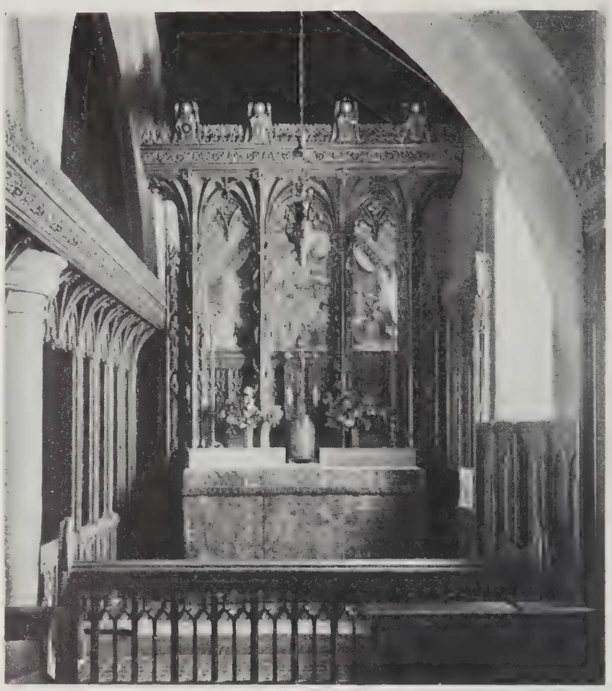
Tabernacle of High Altar
St. Vincent Ferrer's, New York
Bertram Grosvenor Goodhue, Architect

In Emmanuel Church Mr. Ritter has taken unusual care in the design and details of the sacristy. Walls paneled in dark oak make a pleasing contrast with the slightly curved rough plaster ceiling. The paneling forms the concealed doors of the vestment cases. One wall is broken successfully by a small recessed altar of pleasing simplicity and proportions. This fortunate note of religious significance, as well as the delicately modeled ceiling decoration of cross and crown of thorns, gives to this small room a dignity and distinction indicative of its purpose. His design for the organ case in this church is simple in composition, but rich in well balanced and carefully placed decoration. The hood of the projecting bank of trumpets and the balancing banks of horns are ornamented with tracery elaborately carved in flowing floral scrolls of Gothic symbols suggestive of the passion flower and the fruits of the spirit. Grotesque figures holding musical instruments enrich the cresting and corner finials. As in the case of the altar designs, Mr. Ritter has again achieved a happy contrast and balance between the plain and the ornamented elements of the design. The reredos of Emmanuel Church is a carved design of sumptuous richness, executed in Indiana limestone, with a delicacy of detail recalling the elaborate fifteenth century examples at Winchester and Seville. Although smaller in size and lacking in color decoration, it suggests the gorgeous new reredos of St. Thomas' Church, New York. The rich brocade of the antependium gives a pleasing note of color below, repeated in the stained glass of the window above. The design is rich in repeated pedestals and elaborately canopied niches carrying figures of saints and angels, grouped about the central figure of Christ. These figures in stone are the work of that master wood carver of Boston, L. Kirchmayer. The present Gothic revival in this country has produced no craftsman who has contributed more to the beauty and perfection of ecclesiastical decoration than has this talented sculptor in wood and stone.

Between the chancel and the new lady chapel of Grace and St. Peter's Church, also in Baltimore, a wrought iron grille with gates, richly decorated in the manner of the fifteenth century, serves as a screen. Its dignity of design and balance of detail are very satisfying. Deference for the material used and understanding of its purpose characterize this ironwork. Deep horizontal panels of repeated quatrefoils form the base, balanced above a field of slender vertical bars by a richly decorated frieze of four pierced picture panels, surmounted by an ornate cresting divided by five important and floriated finials.



Altar at St. Luke's Chapel, New York
Reredos with riddels and gothic polychromed riddel posts
Wilfred E. Anthony, Architect



Reredos with Richly Carved Canopy
Altar in Chapel in St. John's Church, Newport
Cram & Ferguson, Architects

In this chapel the oak paneling of the altar niche forms a rich background for the brilliantly colored woodwork and painting of the triptych. The ample use of gold and color on the frame and doors of the triptych repeats in modified tones the colors of the painting which forms its central panel. This painting on wood is a magnificent copy of Filippo Lippi's "Adoration," executed by Elizabeth Born. The inner frame is almost completely covered with color, while the outer parts are only touched with it, gradually fading into the dark brown of the background. This transition from the clear and vivid color of the tempera painting of the Adoration to the rich shadows of the altar niche, draws the eye to the focal point of the chapel. This visual attraction to the altar is further enhanced by placing in the upper corner of the rear wall a window filled with amber glass which illuminates the painting of the Madonna and its brilliant triptych.

The floor of this chapel is of Vermont slate, in the center of which is set a unique dedicatory tablet. This tablet is an interesting example of the English type of Gothic inlaid metalwork. The tablet itself is slate into which are set the letters and decoration. Bronze and pewter have been used for the inscription, initials, name and decorations. The diaper pattern border is made of bronze into which are cast alternating squares of pewter. This use of several metals give a richness and variety of tone and color unobtainable from the use of one metal alone. It is the first example of the use of metals inlaid in slate produced in this country, a notable triumph of skill.

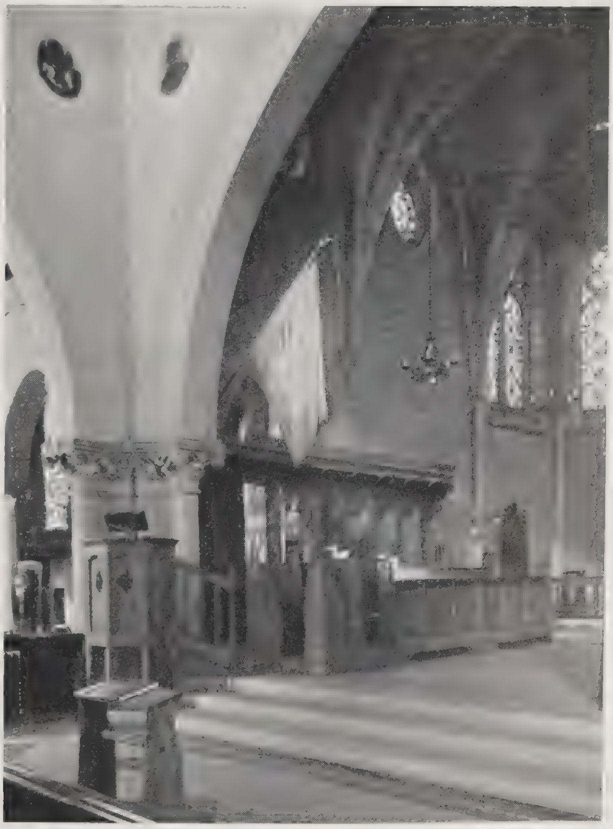
# Church Furnishings

*By* E. DONALD ROBB

A DISCUSSION of church furnishings properly begins with a consideration of the altar or "God's Board," the one essential piece of furniture in the early Church, and today the most important of a score of pieces, large and small, used in the elaborate service of the ritualistic bodies of the Christian Church, and in many instances given the first place by many of those having less formal ideas on the subject of divine worship. Signs are plentiful in church circles to indicate that at no distant day the altar will be restored to its original place of preëminence, and its rivals, the trained quartette, the organ and the pulpit, will be relegated to their proper positions.

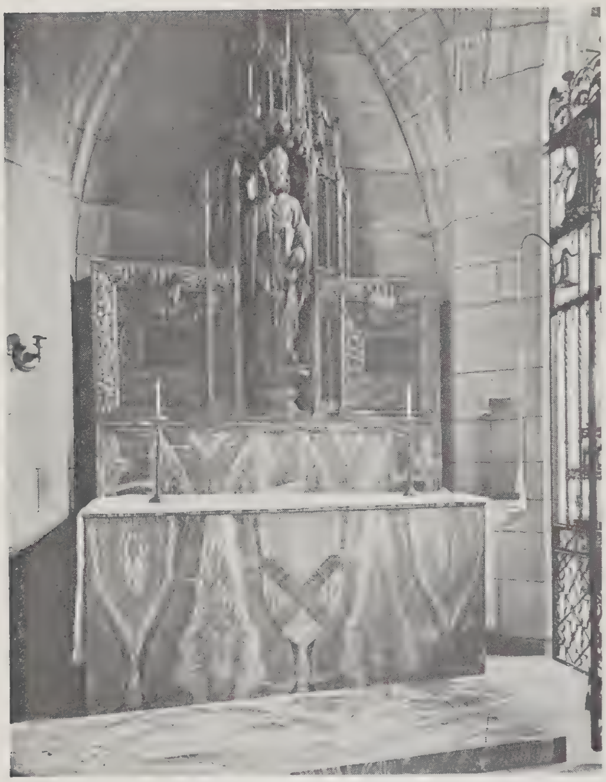
It is not the function of the architect, however, to engage in discussions ecclesiastical over the relative importance of articles of furniture, one to another. When this question has been settled by the churchmen, his clients, it is his duty to arrange each piece so as to produce architectural harmony. It is true that in any composition one thing must occupy the focal position; in a church interior this position is obviously at or near the end of the main axis. If, in this land of religious liberty, where clients are privileged to worship in accordance with the dictates of their own consciences, it has previously been decided, for instance, that the collection plate is the most important object used in the service of worship, then it is the business of the architect to plan accordingly. It is better to let conditions govern, provided they are not mere prejudices, than to force each set of requirements into an ancient mould where they will never be comfortable, and which, for all we know, may be outgrown. The architect may have his own opinions on such subjects, but he can best serve the client by working with him, not against him.

It is not at all imperative that a chancel be arranged after the custom established by the Episcopal or the Roman Catholic Churches in order to be dignified and, to a certain extent, solemn. Examples abound in the Colonial churches where effects of great dignity have been produced without following the mediæval arrangement. This is possible also in churches designed after the Gothic manner, although association seems to demand the deep chancel in this case. It is rarely possible to put the singers in the gallery across the east end of the chancel and have dignity as a result. The church will immediately take on the character of a concert hall—even the pulpit will sink into insignificance. Church music should be directed eastward, not westward.



Trinity Church, Princeton, N. J.
Cram, Goodhue & Ferguson, Architects

The first altars were of wood, probably very simple tables. The custom of using this material still survives in the Eastern Church, and continued in England until nearly the end of the eleventh century, when the Council of Winchester ordered the wooden altars throughout the realm to be demolished and altars of stone consecrated. These were originally severely plain, consisting of single slabs of freestone or marble incised with the five crosses, perhaps beveled on the lower edges and supported on pedestals, on four or five legs, or occasionally on stone brackets. The development from this simple form to the more elaborate types of the fifteenth century was steady, until the Reformation brought a return of the wooden table, when many of the old stone slabs were overthrown and broken, or used as paving stones. The use of wooden tables at this time, while common in the reformed Church, was not made compulsory. Some of these tables, lately associated with more domestic uses, were very beautiful and of fine workmanship, their bulbous or "melon" legs being their most striking characteristic. Many of them could be extended, and from this it is obvious that they must have been used in a very different manner from those of a more ancient day. Such is, indeed, the case, for when Com-



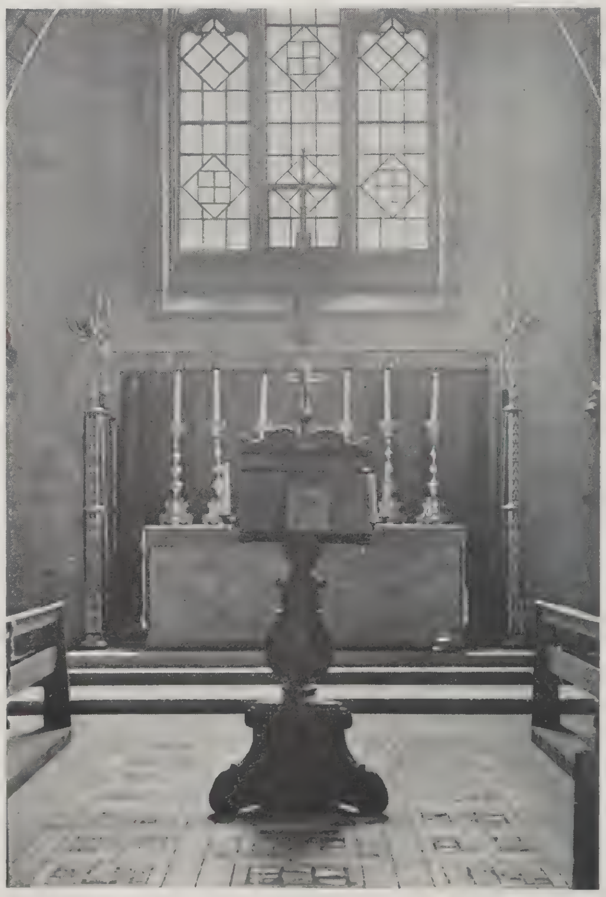
Altar in Chapel of Sts. Patrick and Bridget
Church of St. Vincent Ferrer, New York
Bertram Grosvenor Goodhue, Architect

munion was held in the days of the Commonwealth, the altar tables were carried out of the chancels and into the naves, where the participants seated themselves around the extended boards.

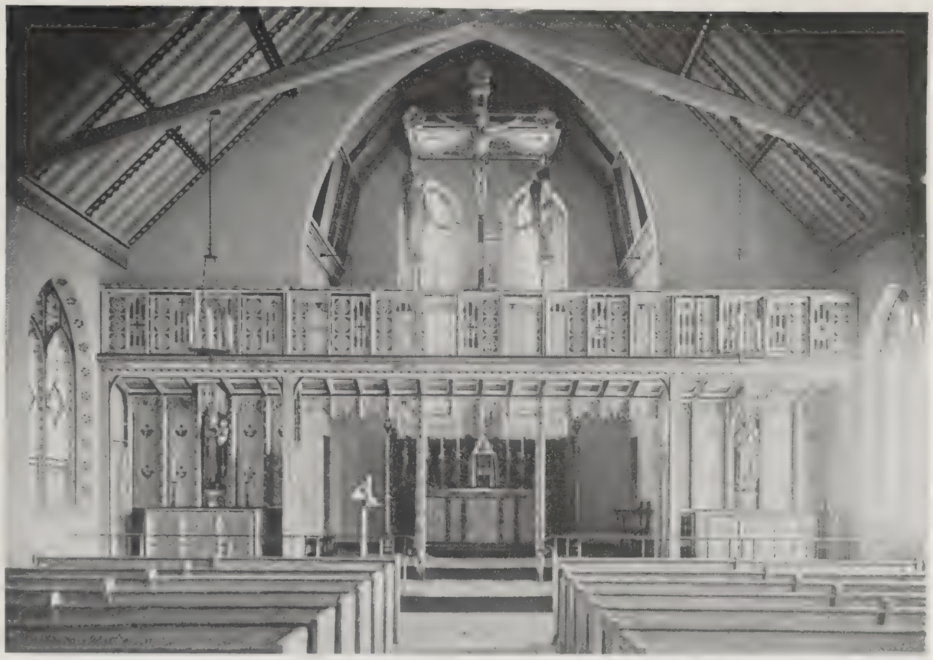
As this custom, happily, disappeared with the Cromwellian regime in England and, at least as far as the writer's knowledge extends, has never been revived in any of the many denominations of the Christian Church, it need not here be given much space. It will be well for us to consider, however, the types of altar now in use, calling attention to their points, good and bad. The most common form used in liturgical churches, but neither the most ancient nor the most dignified, is that type solid to the floor in front and at the sides, supporting a tabernacle and usually two gradines on which stand cross, candlesticks and vases for flowers. This type, carried to its logical conclusion by the purveyors of stock furnishings, has been described with more truth than reverence as a "glorified soda fountain"; or with its gradines increased to four or five, each loaded to capacity, it reminds one of a show window in a cheap retail store—thus defeating its artistic end, which should be to induce a spirit of reverence and devotion.

At the opposite extreme is the altar of the "Sarum" type without gradines or tabernacle, the cross and candlesticks, two or six in number, standing directly on the *mensa*. This was the form most common in pre-Reformation days. At altars where the Sacrament was reserved, the hanging pyx was used, this frequently taking the form of a dove of gold or silver, sometimes richly enameled or set with jewels. Immediately over this hung the pyx cloth and canopy of richly ornamented material. Where the Sacrament is to be reserved on the altar in a Roman Catholic or advanced Episcopal church a tabernacle is necessary, and at least one gradine for cross and candlesticks is likely to be desired. The tabernacle may be of wood or metal. It should contain a steel safe so secured as to be difficult to remove even though the outer door should be forced. This door is usually decorated in relief with symbols of the Passion, the most common being the Chalice and Host, the grapes and wheat, the pelican piercing her breast to nourish her young, and the sacrificial lamb.

From the earliest times it has been customary to provide some sort of screen or special background for the altar. This sometimes took the form of a painting upon the wall against which the altar stood, sometimes a hanging or dorsal with or without side curtains (riddels), and sometimes a more strictly architectural structure of wood or stone, often extremely rich in carving or painted decoration or both. Frequently riddels and reredos are seen in combination; occasionally dorsal and riddels in an architectural frame of carved and gilded wood. Color and gold may be used here without stint if this is to be, as it should be, the center of interest. Color and gold leaf, used extensively in the middle



Altar in Friars' Chapel
Church of St. Vincent Ferrer, New York



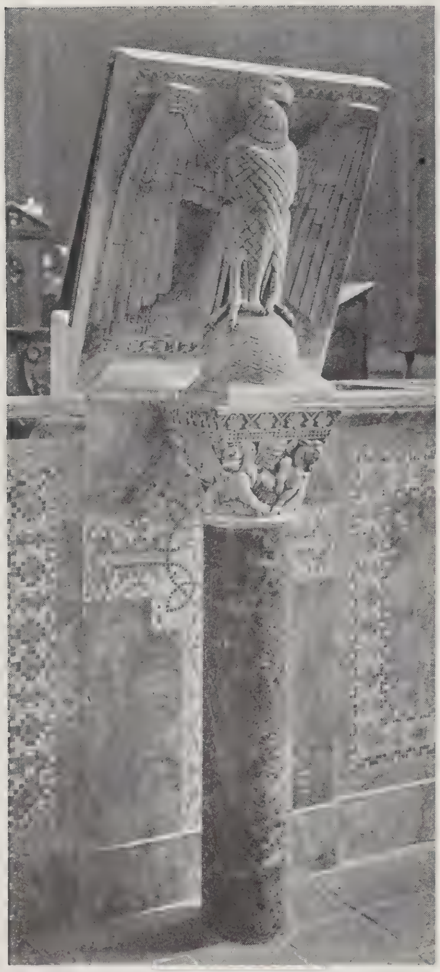
Fine Polychrome Decoration on Altars, Tester and Rood Screen
Wilfred E. Anthony, Architect

ages, and recently revived in England, is becoming more and more familiar to us in this country. Its first appearance here was timid and attended with much "antiquing" lest it appear garish. This need never be done if the secret of such color decoration be understood, that is to avoid large unbroken areas of any color, or even gold. When it seems difficult to adhere to this rule, as in the case of a background color, or in the garments of a figure, a pattern of gold or black will accomplish the result and give much enrichment. Another rule of great importance to be observed is the avoidance of placing color next to color without a separating stripe of black, white or gold. Color schemes should be simple, and usually limited to red, green, blue, white, black and gold. Tertiary colors may be used sparingly on drapery. Several good examples of reredoses, carved, sculptured, and painted in color and gold are shown here as illustrations—recent work from the offices of Bertram Grosvenor Goodhue, Cram & Ferguson, Wilfred E. Anthony, and Perry, Shaw & Hepburn. The beautiful reredos in the chantry at St. Thomas', New York, is easily the best single piece in that place of splendor and symbolism.

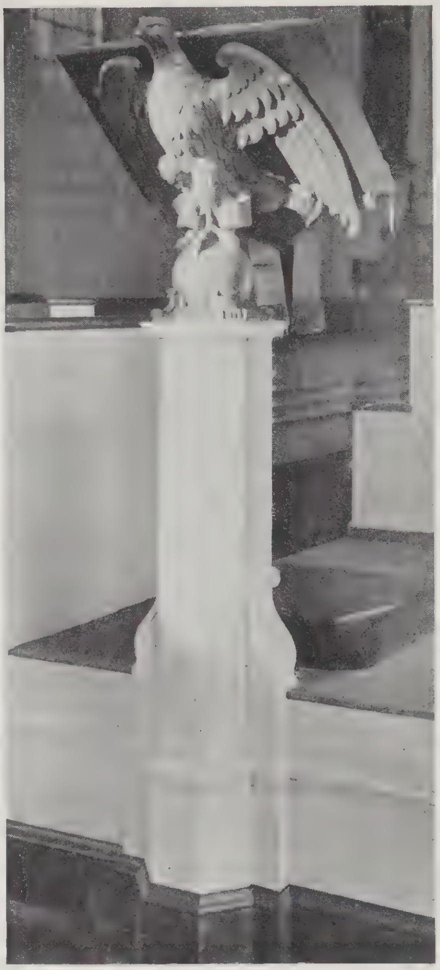
Opinions may differ as to the piece next in order of importance. Some may consider the font, from the sacramental nature of its use, as the equal of the altar. Some, and these are very numerous indeed, would place the pulpit in an equally important place. Others of the liturgical persuasion would so regard the credence; still others, the lectern. Let us consider the lectern next.

It was customary in the middle ages to provide in the chancel a lectern, from which the Gospel was read. This was usually a movable desk, but sometimes it was built into the north or Gospel side wall of the chancel. Another lectern stood in the space between the choir stalls, and held the great books from which the choir sang. These lecterns were generally of two or four sides, many of them extremely rich in carving, and with shafts and bases elaborately buttressed and moulded. The brass eagle or pelican lectern did not appear until the sixteenth century. At the time of the Reformation the chancel lecterns were brought forward to the chancel entrances, where places often had to be made to receive them in existing choir screens. This is their customary place today in parish churches. In cathedrals or in conventual churches they are still to be found in the chancel as well as in the choir screens. As to the placing of the lectern, north or south of the chancel entrance, there seems to be no well established rule among liturgical bodies. In the parish church where the bishop's chair stands on the north side of the sanctuary, it seems proper to place the pulpit on the south side; the lectern then takes its place on the opposite side. The type of lectern common to the Gothic church, while frequently beautiful, is usually insignificant—if one considers its important use in the church service. More appropriate in their size and arrangement are the *ambos* of the early Italian churches. With these in mind, let us picture the ideal Gothic lectern.

The sacred character of its function will be proclaimed by its size, elevation and enrichment, and the fact that it will be approached from within the chancel parapet. Its floor level will be higher than the level of the floor in the pulpit opposite, for its message is from a higher source. It will be in two parts and of two materials, suggesting the two grand divisions of Scripture, the Old and the New Testaments. The base will be of stone, the more ancient material supporting the parapet and superstructure, which will be of wood, a material higher in the order of creation. The theme of its decoration will be the unity of Scripture. Sculptured panels in bas-relief in the stone base will match—subject to subject—with panels in the wood parapet above in some such manner as this: The giving of the Ten Commandments paralleled by the Sermon on the Mount and the giving of the Beatitudes. Moses lifting up the serpent in the wilderness, in juxtaposition to the Crucifixion. Melchizedek, king and priest, bearing



Eagle, in Stone and Mosaic
Lectern, St. Bartholomew's, New York
Bertram Grosvenor Goodhue, Architect



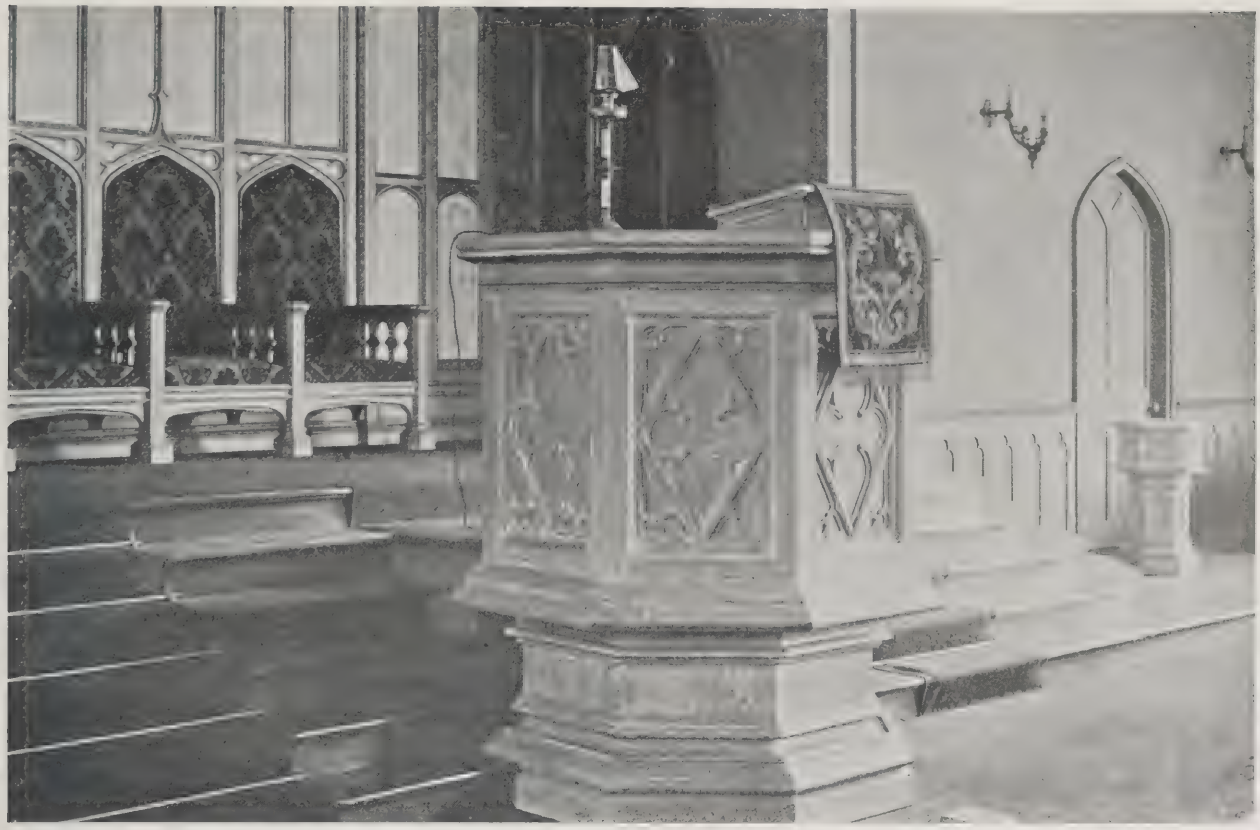
Lectern of Eagle Type
St. Paul's, Newburyport, Mass.
Perry, Shaw & Hepburn, Architects

bread and wine, with Christ at the Last Supper, and other examples of a similar nature. At the four free corners of the lectern will be four niches in which will be found figures of the four major prophets, bearing on their shoulders the four evangelists, as pictured in the great south transept window at Chartres. The central panel of sculpture will show Christ opening the Hebrew Scriptures to His disciples, and explaining therein the things concerning Himself. The bookrest will be richly carved and overlaid with gold, and over all a canopied tester will be built in spirelike form against the chancel pier.

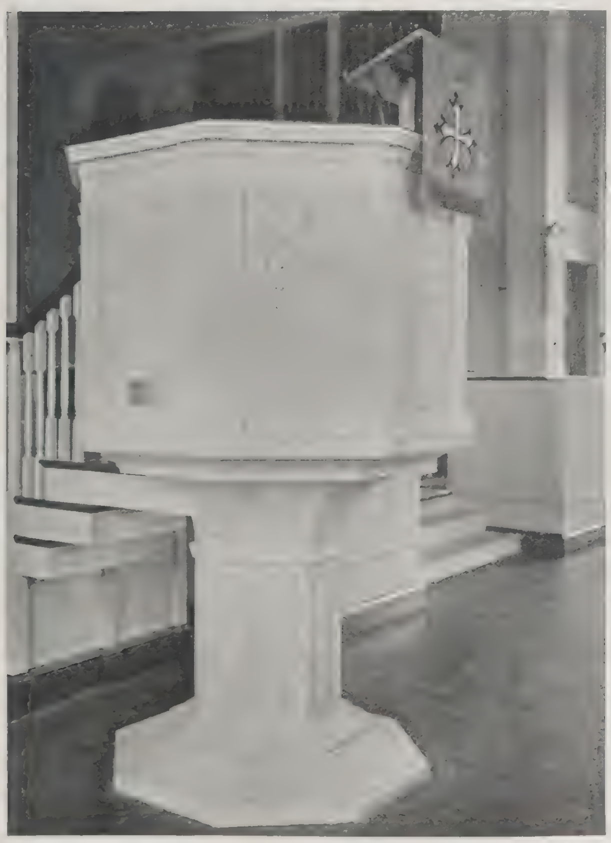
Few pulpits antedating the fifteenth century are to be found today. Their use before that time seems not to have been general. Their position was usually against the first free-standing pier west of the chancel arch, sometimes on the north, sometimes on the south side; but many were later moved to their present positions against the choir screens. Frequently they were most elaborately decorated, and very often quite small and slender, in some cases of slightly more than 2 feet inside diameter. This added greatly to their grace and scale, if not to the comfort of the preachers. The hexagon seems to be the most common form, with the octagon almost equally popular, although nine- and twelve-sided pulpits are not uncommon. Doors to pulpits may or may not be used. Many were at one time provided with doors, now usually missing, and in most instances the steps are modern. Bases were often of stone, especially in the earlier examples, while in the later types the superstructure rests on a slender stem with moulded cap and base branching out with graceful coving to meet the sill. Wherever it is possible, the pulpit should be placed against a masonry wall or broad pier, for acoustical reasons. In a very long church it may be necessary to locate it against one of the nave piers, although objections will inevitably be raised to this by those who occupy the front pews. There are instances where front pews are so arranged that their occupants may turn about to face the pulpit at the time of a sermon. In mediæval days, when the congregation stood through the whole service, the pulpit could be located almost anywhere without inconvenience.

In a sacramental sense the font is next in importance to the altar, although frequently in liturgical as well as in non-liturgical churches it is forced to occupy a very unimportant position in the church. Its historical and symbolical position is near the main entrance, and whenever possible it should be so placed. The desirability of having it located so that a certain portion of the seating space is available for private baptisms, or when the sacrament is performed during the regular service so that all may witness the ceremony, has led to the custom of having the font placed well up toward the chancel.

Fonts are most frequently of stone, although old ones of wood, lead and even brick, dating from pre-Reformation times, are still in existence in England. The favorite shape has always been the octagon—eight signifying re-creation or re-birth, the first creation occupying seven days, the eighth marking the beginning of new life. Circular fonts are very common, however, and one occasionally meets with



Pulpit and Chancel Chairs, Unitarian Church, Fall River, Mass.
Parker Morse Hooper, Architect

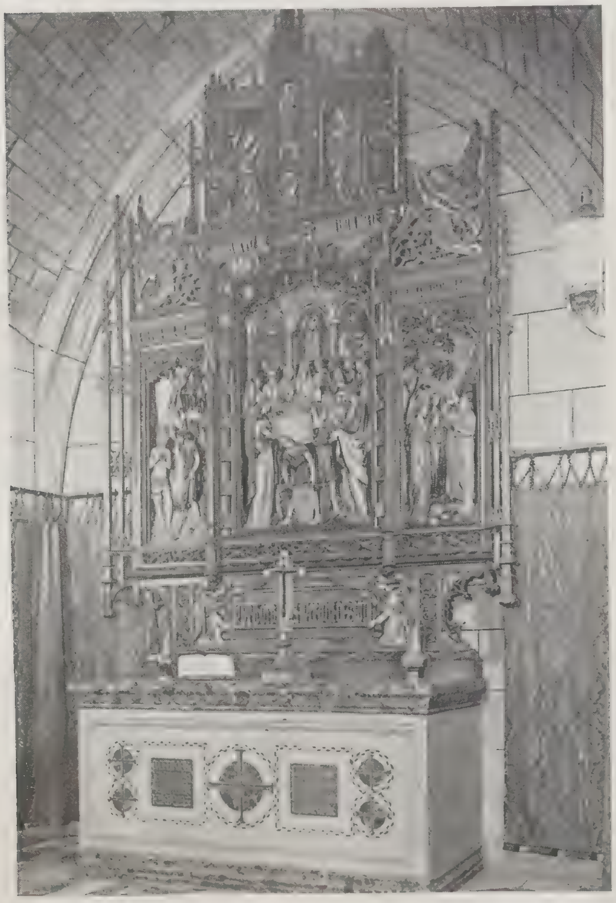


Pulpit, St. Paul's, Newburyport, Mass.
Perry, Shaw & Hepburn, Architects

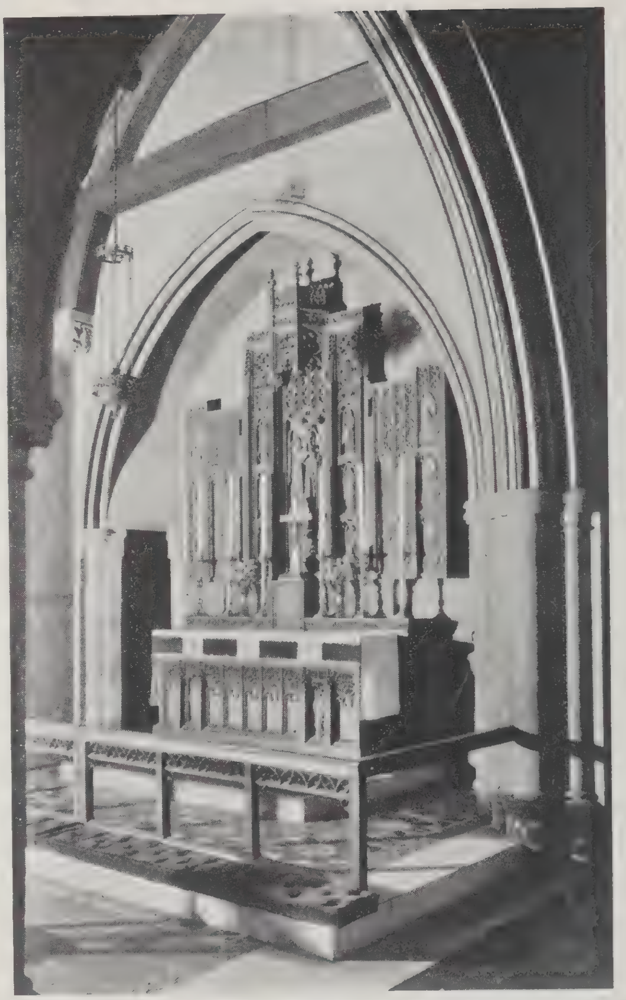
square, hexagonal, heptagonal, or even pentagonal fonts. The earliest fonts are of the "tub" shape, without base. The chalice form, surrounded by small columns, was also characteristic of early mediæval days. While it is a modern custom to elevate the font three steps above the floor, this is not by any means the traditional practice. In fact there seems to have been no fixed rule governing this matter, and fonts raised one step, or two steps are quite as numerous as those elevated three steps in height. There are also many instances of fonts set directly on the nave floor.

The font cover affords a wonderfully fine opportunity for interesting craftsmanship, and for the display of mechanical ingenuity in designing the raising and lowering devices. The original object of the font cover was to prevent the improper use or profanation of the water which was always kept in the font. The cover must be provided with some means of locking, and must be kept locked except when in use. The more pretentious covers usually took the form of elaborate spires, raised by means of counterbalanced weights often, but not always, within the spire itself, the whole being suspended from a bracket or from the roof timbers. Stationary covers provided with doors are also common, and provide an opportunity for figure decoration on the inside and hardware on the outside. An unusual and interesting form of cover is that of the sixteenth century font at Trunch, in Norfolk, England —an elaborate affair supported from the floor on six posts, and forming a canopy over the font, with sufficient room on all sides for the officiating priest. Carried out in the most elaborate form, with tier upon tier of canopied niches, gradually diminishing into a delicate spirelike pinnacle, crowned with its dove or pelican, the whole structure gilded and colored, this font cover presents a gorgeous spectacle, rivaling in splendor the reredos itself.

Volumes might be, and indeed have been, written about the choir and parclose screens of the late middle ages in England; but within the limits of a short paper it is not possible to give them much more than passing mention. The popularity of the screen is easily understood, for it offers exceptional opportunities to the designer and wood carver and adds much to the effect of dignity and mystery in the church. While their purpose seems to have been largely symbolic and æsthetic, screens were in many instances combined with the rood loft and used by the priest in reading the Epistle and Gospel, or as musicians' galleries. In this form, with the vaulted overhangs rich in carving and tracery and often decorated in color, they are perhaps the most beautiful creations of the wood workers' art which have come down to us from mediæval England. Although their use today will necessarily be limited to churches of a "high" tendency, they offer suggestions in simplified form for narthex and gallery screens in churches of any denominations, or even in parish halls. Their running bands of exquisitely carved grape and other vines offer a never-failing supply of suggestions for the artist, while the few surviving painted panels give us some idea of the skill of the mediæval craftsman in decorative figure painting.



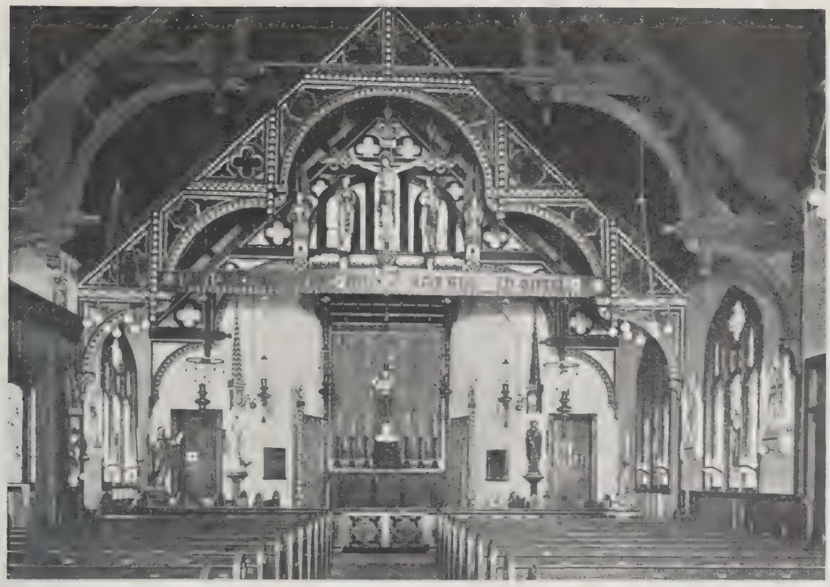
Chantry Altar, St. Thomas' Church, New York
Cram, Goodhue & Ferguson, Architects



Lady Altar, All Saints', Dorchester, Mass.
Cram, Goodhue & Ferguson, Architects

Of all the furnishings and fittings which go into the modern church, that which is of the greatest interest to the majority of the congregation is the organ. In this instance, and in but one other—the lighting fixtures—we have no mediæval precedent to draw upon; for while in every other respect the churches of the middle ages are well worthy of emulation, their organs and other musical instruments were of the most primitive sort. Development in music and musical instruments since the days of the great church builders has gone far toward making amends for the decline in the arts of stained glass and figure sculpture. There are, of course, a few organs and organ cases dating back to the Renaissance, but the problem of the organ, its housing and decoration is essentially modern.

The location of the organ chamber (so says the organ builder) is one of the most important con-



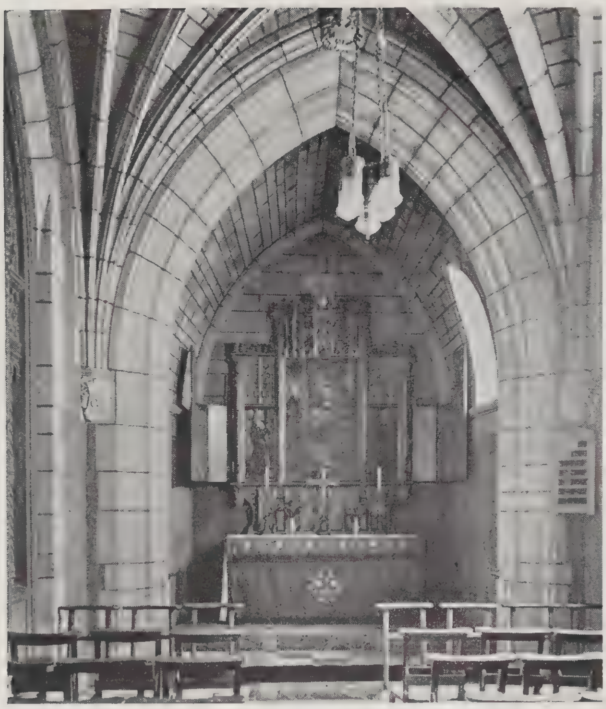
View of Nave and Sanctuary
Church of the Holy Innocents, Pleasantville, N. Y.
Gothic altar with tester, dorsal and riddels

siderations in the planning of the church. This would indeed be true, were the church a concert hall; but, while the organ is an important detail in the church furnishings, and every effort should be made to provide adequate space for its intricate and delicate mechanism, the real purpose of the church must always be kept clearly in mind, and its various parts arranged in proper order. Although he never expects us to follow his advice, we should always consult the organ builder at an early stage in the preparation of drawings for the church. He will tell us that the chamber should have a clear inside height, over as large an area as possible, of 22 feet, and that it should open out into the church with an opening as large as space will permit. It should not be located near a chimney, neither should it be lighted by windows, unless double glass be provided. In order to protect the organ from possible damage by leaky roofs, a protective roof of timber covered with some good roofing material should be hung from the rafters of the chamber and connected at its lower side with a drain. There must be a motor room provided somewhere nearby, with the possibility of obtaining air direct from the church. As the motor is frequently noisy, it must be soundproofed from the church proper. If it is in the cellar, there must be a pipe provided for the delivery of air to the organ above. This will be a round pipe 10 or 12 inches in diameter. The console with its bench will occupy a floor space 6 feet square, and unless one is watchful it will be found to be very bulky. By sinking it a step or two below the neighboring choir benches it will not be too much in evidence. Its proper location, with respect to the organ, is on the opposite side of the chancel.

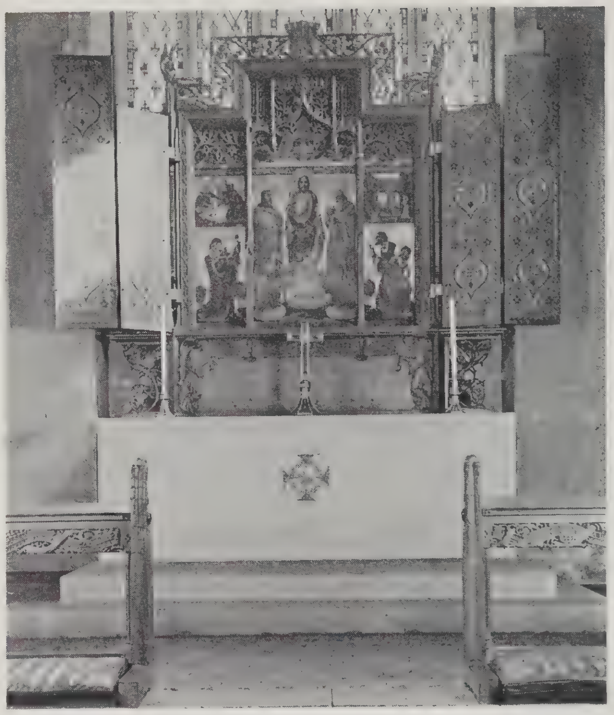
Where the organ and singers are located in a gallery at the west end of the church, the chance of the organ tones being stifled is removed, and both organ and choir act as supports to the congregational singing. The earliest of the large organs, those of early post-Reformation days, were usually built on the rood screens, displacing the then unpopular rood. In this position, with the small choir organ facing the choir, and the great organ fronting toward the congregation, there was nothing to interfere with the perfect operation of the instrument. Æsthetically, however, it does not seem correct to block the main axis with an object of secondary importance.

Of the remaining furniture of the chancel and sanctuary, altar rail, choir benches, bishop's chair and kneeler, little can be said without exceeding the limited space assigned to this paper. A word of advice to the novice in Gothic design may not be out of place at this point, which is that it is dangerous to try for originality, since disaster will surely follow. In fact it is not too much to say that this applies to the expert as well. A too apparent attempt at originality, even though artistically successful, makes too much of a self-conscious display of one's "personality" to be good Gothic, besides being quite out of

Students' Chapel, Boston College
Maginnis & Walsh, Architects



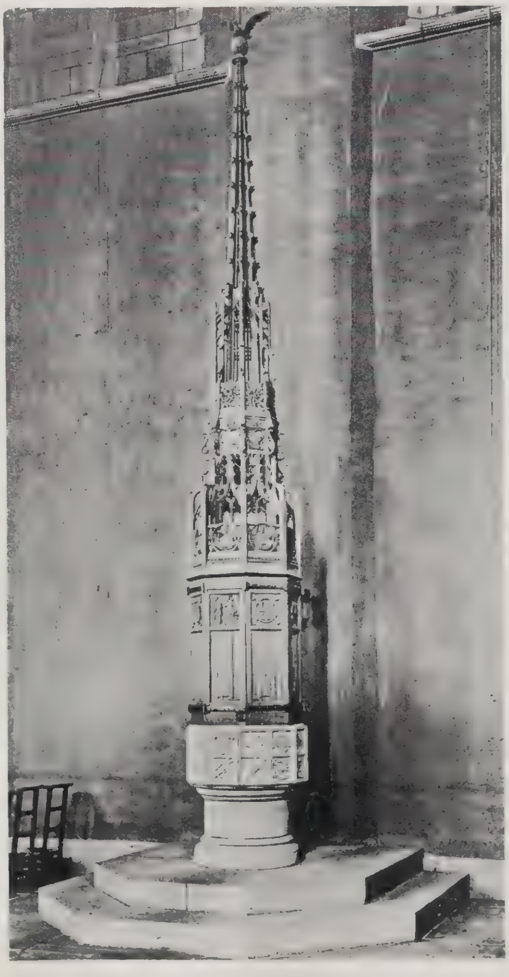
Triptych, Chapel of the Intercession, New York
Bertram Grosvenor Goodhue, Architect



Altar, St. Mark's Church, Mt. Kisco, N. Y.
Bertram Grosvenor Goodhue, Architect

place in a church. After examining, perhaps with much momentary enjoyment, the stunts and clever tricks of design in some of the best modern examples of furniture, one turns with relief and satisfaction to the fine old work of the middle ages. The one soon becomes tiresome, like a twice-told joke—the other improves with acquaintance, and never fails to arouse our admiration. As it is practically impossible ever to copy anything, line for line, detail for detail, without sooner or later coming to the point where conditions demand something different, it follows that everything we do must in some sense be original. Beyond this point it is dangerous for the novice to venture, and even the experienced must proceed with caution, or his work will be largely a display of "ego."

If it comes to a point of deciding between pews and individual chairs for the seating of the congregation, there are arguments in favor of each. The average congregation will prefer pews because it has always been used to pews. The idea of the "family pew" still clings, while the family row of chairs lacks the same sentimental appeal. You will be told that pews are more comfortable, which may be true, and that if one has a pew, one always knows where to sit, while chairs always get moved this way and that. The latter is a point in favor of chairs, for they can be moved forward and backward, arranging the spacing to suit the size of the congregation. Chairs are perhaps the more pleasing architecturally, although well designed pews, rather low, and spaced a generous 3 feet or more on center can be very handsome. Square pew ends are to be preferred, but if placed too close together, they impose a hardship on the portly. In designing the supports to the seat, leave plenty of room for kneeling. Make the seats comfortable; there is no rea-



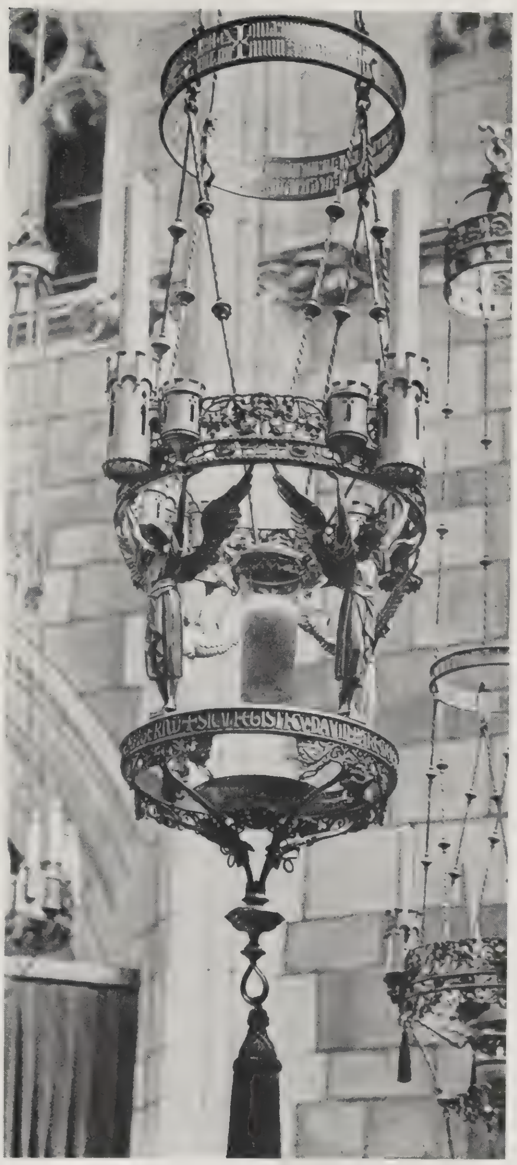
Font with Gothic Canopy
Chapel of the Intercession, New York

son why one should not be comfortable even in church.

The problem of artificial lighting in its two aspects—practical and artistic—is always with us. There are several ways to do it, and one may take one's choice. Bracket lights may be attached to each pier, with additional brackets on the aisle walls. If the seats in the middle aisle receive any of the light, they are lucky. Or, fixtures may be hung from truss or vault, shedding the light at places best suited to a general distribution. This is efficient, although it does seem silly to wire to the roof and then down again. A modification of this scheme is to drop the lights from projecting brackets. A more reasonable but less usual arrangement is to light from standards set among the pews. This latter scheme can be successfully adopted in the choir stalls, as at Gloucester Cathedral. The effect of the lighting when kept low is much more beautiful, the roof being dim and shadowy. It is better, therefore, both practically and artistically, to design the fixtures so as to shed all of their light downward, and leave the roof in darkness. The individual lighting of pulpit and lectern should not be overlooked when designing those pieces. Electrified candlesticks with metal or mica shades may stand beside the manuscript desk on the pulpit rail; bracket lights from the sides of the lectern with hooded reflectors to light the page will do well at that place; or, if the lectern stands on the floor, a wrought iron standard by its side will serve the same purpose. The horizontal tubular lamp can also be used on the front of manuscript rack or book rest, if architectural camouflage be provided to cover its commercial nakedness.

To cover the subject of church furnishings adequately, some mention should be made of the fittings of the sacristies and robing rooms as well as of the practice room for the choir. The choir vesting and practice room may be combined if the choir is composed of men and boys only. For a mixed choir, two vesting rooms with toilets will be necessary, although if space and funds are limited, the larger, possibly the men's, may be used for practice. For this purpose, it should be as large and lofty as possible, approximating the chancel in size, with the seats arranged in the same manner. Where conditions are ideal, the choirmaster has a separate room in which all music is kept. Individual lockers or wardrobes should be provided for cassocks and cottas. Altar vestments are hung, without folding, in cases made especially for that purpose, and may be housed in the working sacristy or in some room convenient to the chancel. Cases for clergy vestments are of course provided in the clergy sacristies, and their number and design will vary with the type of service. A safe, large or small as the case may require, will be needed for altar vessels and plate, or anything of value.

In the designing of church furnishings, to the same extent as in the designing of the church fabric itself, the real purpose of the work should be kept in mind. This purpose is, not to advertise the architect, through the publication or exhibition of his work or in any other way; neither is it to provide him with an entertaining problem, wherein he can give expression to his "personality" or his pet ideas, theories or hobbies. His work should, by the subtle power of its beauty, combine with the beauty of the music and the ritual to arouse the spirit of worship. The results of his study are, therefore, more than æsthetic, and his problem is more than architectural.



One of Seven Gothic Altar Lamps
Church of St. Vincent Ferrer, New York
Bertram Grosvenor Goodhue, Architect

Church bells, and the methods of casting, tuning and mounting, ancient and modern, present a subject which the church architect or any other might pursue to advantage. Every church tower of any size should be built to receive chimes with chamber for ringers below. Chimes rung from a keyboard must obviously be operated by hammers, and the use of this all-too-easy method has resulted in the abuse of the art of bell ringing. Unpleasant overtones produce false harmony, and the effect, except from a great distance, is likely to be altogether disappointing.

# EDITORIAL COMMENT

## RELIGIOUS INFLUENCE UPON ARCHITECTURE

AS architecture is the highest form of art, so art is the sublime material achievement of mankind. It is the natural medium through which humanity interprets the joy of life and demonstrates the extent of its civilization. Springing from the innermost recesses of the human spirit, it is one of the visible and tangible evidences of spiritual power expressed through the medium of the human mind. In "Church Building" Ralph Adams Cram says that art is the result of beautiful ideas, of beautiful modes of life, of beautiful environment, and that in all its forms it owes its inspiration to the Church, without which it could not have existed. The highest expression of the art of a people has always been religious architecture, because the building of a church is in itself an act of worship, a confession of faith. In the progress of building, the religious edifice has led all others; it has furnished precedents and traditions as well as opportunity and inspiration for all the arts; it has made architects famous and workmen skillful and has preserved the continuity of architectural development throughout the centuries. As during the dark days of the middle ages, the Church was the repository of the culture and literature of ancient civilization, so also through the artistic destruction and deterioration of the Reformation it was the guardian of all the art of the past, preserving it for posterity.

View from North Transept
All Saints', Peterboro, N. H.
Cram & Ferguson, Architects

Consciously or unconsciously, to many people a church leads the mind back through the past centuries of Christian worship from the beginning of the Church to the present, and embodies the idea of consecutive centuries of devotion, to which we in the present day are adding the latest contribution. The earliest temples erected by the Egyptians for the worship of their deities, 40 centuries before the Christian era, were followed by the highest development of the pagan temples of Greece and Rome, and these temples in turn by the arcaded basilicas of the early Christians, the gorgeous Byzantine and Romanesque churches of the early Catholics, which developed into the dazzling beauty of the full Gothic style in the great cathedrals of France and England. Then the Church largely reverted to classic influence in the highly ornate religious edifices of the Italian Renaissance, influencing during the seventeenth and eighteenth centuries the architecture of France, as shown in the styles of the several Louis, and the Empire, and of England, as exemplified in the periods of the several Georges, and carried over the seas to eventually fade away in the American Colonial and Empire or neo-Grec architecture. Thus we can trace the unbroken influence of religion upon architectural development and history.

Although the inspiration of creative art was dulled and diverted by materialism during the greater part of the nineteenth century, the Gothic revival in England, which inaugurated a fresh interest in church architecture, followed as it was in this country by a return to Classic and Renaissance precedent, has gradually given renewed vigor to the architecture of ecclesiastical edifices, evidenced by the splendid churches built both in England and America during the past 20 years in which massiveness of construction, grandeur of scale, dignity of proportion and beauty of well placed decoration all demonstrate the never-ending influence of religion upon architecture.

At the present time the trend of church architecture in this country as well as in England is toward a more conscious and visible expression of the eternal verities for which the Church stands, exemplified by truth of design, integrity of construction, durability of material, grace of proportion, dignity of scale, beauty of detail, symbolism of ornament, warmth of stained glass and richness of furnishings. This endeavor to perpetuate in the religious structure something of the significance of its high purpose is not alone restricted to the architecture of the liturgical Churches. It is indicated quite as distinctly in the recent designs of churches of the various Protestant denominations and the members of its faith which have found a haven in this land of religious freedom, all this evidence of the growing desire and effort to more truthfully and fittingly portray the deep significance of the varied expressions of religious faith in the architecture of the structure which is to be its temple. Never has there been a greater opportunity than there is today for the architect to make a real and lasting impression on civilization and life through his untiring zeal and unceasing effort in the expression of his highest creative instinct in this vast and inspiring field of artistic achievement—the building of the House of God.

F.Q.

# THE ARCHITECTURAL FORUM

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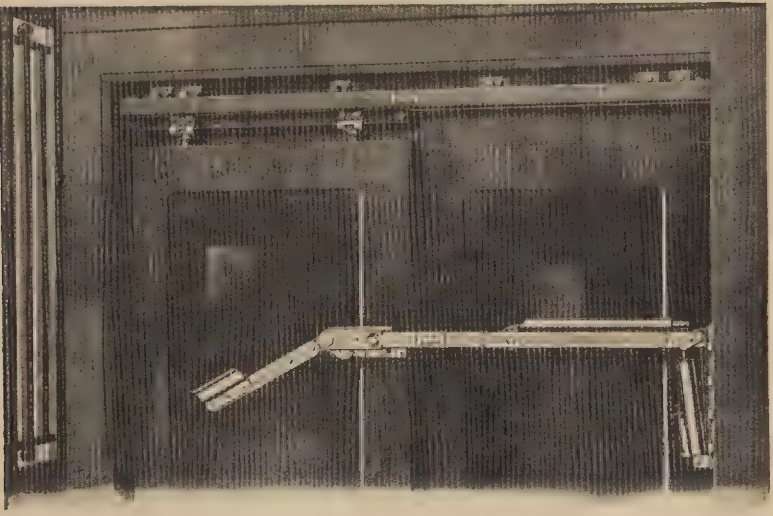

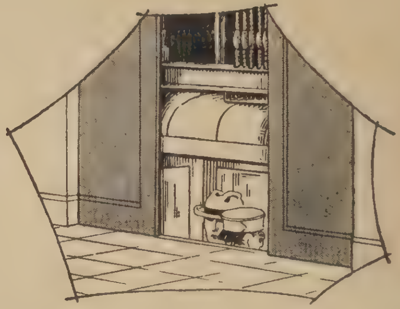

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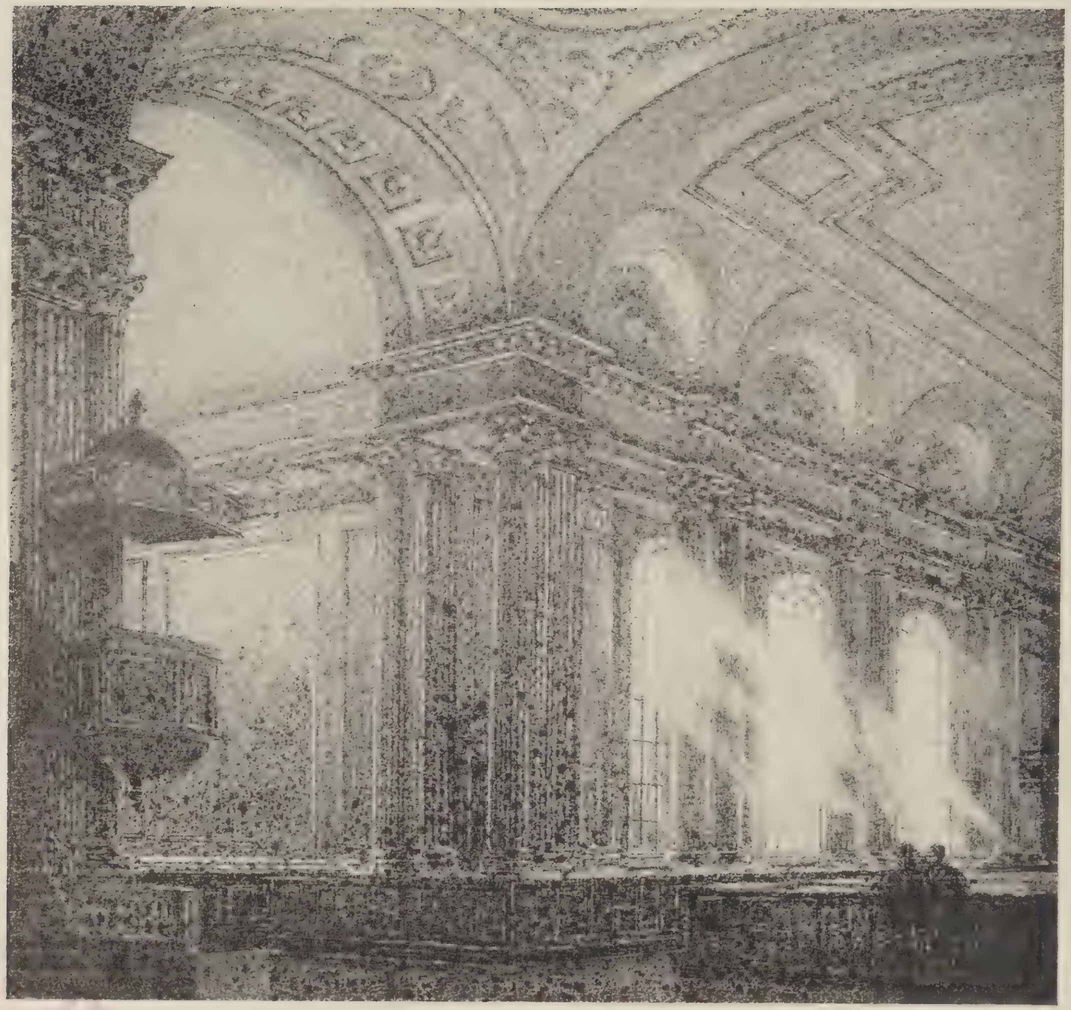

INTERIOR OF A CHURCH BY THOMAS HASTINGS
FROM PENCIL DRAWING BY Y. TERSIAN

The
ARCHITECTURAL
FORUM

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# Modern Architecture

*By* THOMAS HASTINGS

*An Address Delivered Before the Royal Institute of British Architects*

WE American architects are ofttimes confronted with the question why we have not an architecture of our own—one which is essentially American; and why it is that so many of us who have studied in Paris seem inclined to inculcate the principles of the Ecole des Beaux Arts into our American architecture. The majority of people do not seem to realize that in solving the problems of modern life the essential is not so much to be national, or American, as it is to be modern, and of our *own* period.

The question of supreme interest is: What influence has life in its different phases upon the development of architectural style? Style in architecture is that method of expression in the art which has varied in different periods, almost simultaneously throughout the civilized world, without reference to the different countries, beyond slight differences of national character, mostly influenced by climate and temperament.

Surely modern architecture should not be the deplorable creations of the would-be style inventors, the socialists who have penetrated the world of art farther than they have the world of politics, who are more concerned in promulgating an innovation than in establishing a real improvement—so-called Futurists, New Thinkers, Cubists, art nouveau followers, all unrelated to the past without thought of traditions. No more should modern architecture be the work of the illogical architect, living in one age and choosing a style from another, without rhyme or reason, to suit his own fancy or that of his client.

The important and indisputable fact is not generally realized that from prehistoric times until now each age has built in one, and only one, style. Since the mound builders and cave dwellers, no people, until modern times, ever attempted to adapt a style of a past epoch to the solution of a modern problem. In such attempts is the root of all modern evils. In each successive style there has always been a distinctive spirit of contemporaneous life from which its root drew nourishment. But in our time, contrary to all historic precedents, there is this confusing selection from the past. Why should we not be modern and have one characteristic style expressing the spirit of our own life? History and the law of development alike demand that we build as we live, according to our means.

One might consider the history and development of costumes to illustrate the principle involved. In our dress today we are modern, but sufficiently related to the past—which we realize when we look upon the portraits of our ancestors of only a generation ago. We should not think of dressing as they did, or of wearing a Gothic robe or a Roman toga; but, as individual as we might wish to be, we should still be inclined, with good taste, to dress according to the dictates of the day.

The irrational idiosyncrasy of modern times is the assumption that each kind of problem demands a particular style of architecture. Through prejudice, this assumption has become so fixed that it is common to assume that if building a church or a university we must make it Gothic; if a theater, we must make it Renaissance. One man wants an Elizabethan house, another wants his house early Italian. With this state of things, it would seem as though the serious study of character were no longer necessary. Expression in architecture, forsooth, is only a question of selecting the right style.

The two classes with which we must contend are, on the one hand, those who would break with the past, and, on the other, those who would select from the past according to their own fancy.

Style in its growth has always been governed by the universal and eternal law of development. If from the early times, when painting, sculpture, and architecture were closely combined, we trace their progress through their gradual development and consequent differentiation, we cannot fail to be impressed by the way in which one style has been evolved from another. This evolution has always kept pace with the progress of the political, religious, and economic spirit of each successive age. It has manifested itself unconsciously in the architect's designs, under the imperatives of new practical problems, and of new requirements and conditions imposed upon him. This continuity in the history of architecture is universal. As in nature the types and species of life have kept pace with the successive modifications of lands and seas and other physical conditions imposed upon them, so has architectural style in its growth and development *until now* kept pace with the successive modifications of civilization. For the principles of development should be as dominant in art as they are in nature. The laws of natural selection and of the survival of the fittest have shaped the history of architectural style just as truly as they have the different successive forms of life. Hence the necessity that we keep and cultivate the historic spirit, that we respect our historic position and relations, and that we realize more and more in our designs the fresh demands of our time, more important even than the demands of our environment.

What determining change have we had in the spirit and methods of life since the revival of learning and the Reformation to justify us in abandoning the Renaissance or in reviving mediæval art—Romanesque, Gothic, Byzantine, or any other style? Only the most radical changes in the history of civilization, such as, for example, the dawn of the Christian era and of the Reformation and the revival of learning, have brought with them correspondingly radical changes in architectural style.

Were it necessary, we could trace two distinctly parallel lines, one the history of civilization and the other the history of style in art. In each case we should find a gradual development, a quick succession of events, a revival, perhaps almost a revolution and a consequent reaction, always together, like cause and effect, showing that architecture and life must correspond. In order to build a living architecture, we must build as we live.

Compare the Roman orders with the Greek and with previous work. When Rome was at its zenith in civilization, the life of the people demanded of the architect that he should not only build temples, theaters, and tombs, but baths, basilicas, triumphal arches, commemorative pillars, aqueducts, and bridges. As each of these new problems came to the architect, it was simply a new demand from the new life of the people, a new work to be done. When the Roman architect was given such varied work to do, there was no reason for his casting aside all precedent. While original in conception, he was called upon to meet these exigencies only with modifications of the old forms. These modifications very gradually gave us Roman architecture. The Roman orders distinctly show themselves to be a growth from the Greek orders, but the variations were such as were necessary so that the orders might be used with more freedom in a wider range of problems. These orders were to be brought in contact with wall or arch, or to be superimposed upon one another, as in a Roman amphitheater. The Roman recognition of the arch as a rational and beautiful form of construction, and the necessity for the more intricate and elaborate floor plan, were among the causes which developed the style of the Greeks into what is now generally recognized as the Roman or Classic style.

We could multiply illustrations without limit. The battlements and machicolated cornices of the Romanesque, the thick walls and the small windows placed high above the floor, tell us of an age when every man's house was indeed his castle, his fortress, and his stronghold. The style was then an expression of that feverish and morbid aspiration peculiar to mediæval life. The results are great, but they are the outcome of a disordered social status not like our own, and such a status could in nowise be satisfied with the simple classic forms of modern times, the architrave and the column.

Compare a workman of today building a Gothic church, slavishly following his detail drawing, with a workman of the fourteenth century doing such detail work as was directed by the architect, but with as much interest, freedom, and devotion in making a small capital as the architect had in the entire structure. Perhaps doing penance for his sins, he praised God with every chisel stroke. His life interest was in that small capital; for him work was worship; and his life was one continuous psalm of praise. The details of the capital, while beautiful, might have been grotesque, but there was honest life in them. To imitate such a capital today, without that life, would be affectation. Now a Gothic church is built by laborers whose one interest is to increase their wages and diminish their working hours. The best Gothic work has been done and cannot be repeated. When attempted, it will always lack that kind of mediæval spirit of devotion which is the life of mediæval architecture.

If one age looks at things differently from another age, it must express things differently. We are still living today in the period of the Renaissance. With the revival of learning, with the new conceptions of philosophy and religion, with the great discoveries and inventions, with the altered political systems, with the fall of the Eastern Empire, with the birth of modern science and literature, and with other manifold changes all over Europe, came the dawn of the modern world; and with this modern world there was evolved what we should now recognize as the modern architecture, the Renaissance, which pervaded all the arts and which has since engrossed the thought and labor of the first masters in art. This Renaissance is a distinctive style in itself, which, with natural variations of character, has been evolving for almost four hundred years.

So great were the changes in thought and life during the Renaissance period that the forms of architecture which had prevailed for a thousand years were inadequate to the needs of the new civilization, to its demands for greater refinement of thought, for larger truthfulness to nature, for less mystery in form of expression, and for greater convenience in practical living. Out of these necessities of the times the Renaissance style was evolved

—taking about three generations to make the transition—and around no other style have been accumulated such vast stores of knowledge and experience under the lead of the great masters of Europe. Therefore whatever we now build, whether church or dwelling, the law of historic development requires that it be Renaissance, and if we encourage the true principles of composition it will involuntarily be a modern Renaissance, and with a view to continuity we should take the eighteenth century as our starting point, because here practically ended the historic progression and entered the modern confusion.

Imagine the anachronism of trying to satisfy our comparatively realistic tastes with Gothic architectural sculpture or with paintings made by modern artists! Never, until the present generation, have architects presumed to choose from the past any style in the hope of doing as well as was done in the time to which that style belonged. In other times they would not even restore or add to a historic building in the style in which it was first conceived. It is interesting to notice how the architect was even able to complete a tower or add an arcade or extend a building, following the general lines of the original composition without following its style, so that almost every historic building within its own walls tells the story of its long life. How much more interesting alike to the historian and the artist are these results!

In every case where the mediæval style has been attempted in modern times the result has shown a want of life and spirit, simply because it was an anachronism. The result has always been dull, lifeless, and uninteresting. It is without sympathy with the present or a germ of hope for the future—only the skeleton of what once was. We should study and develop the Renaissance and adapt it to our modern conditions and wants, so that future generations can see that it has truly interpreted our life. We can interest those who come after us only as we thus accept our true historic position and develop what has come to us. We must accept and respect the traditions of our fathers and grandfathers and be, as it were, apprenticed by their influence. Without this we shall be only copyists, or be making poor adaptations of what was never really ours.

The time must come—and, I believe, in the near future—when architects of necessity will be educated in one style, and that will be the style of their own time. They will be so familiar with what will have become a settled conviction and so loyal to it that the entire question of style, which at present seems to be determined by fashion, fancy, or ignorance, will be kept subservient to the great principles of composition which are now more or less smothered in the general confusion.

Whoever demands of an architect a style not in keeping with the spirit of his time is responsible for retarding the normal progress of the art. We must have a language if we would talk. If there be no common language for a people, there can be no communication of ideas, either architectural or literary. I am convinced that the multiplicity of printed books and periodicals written by literary critics and essayists who have not even been apprenticed but are writing with authority about art, has, perhaps, been more instrumental than anything else in bringing about this modern confusion. I believe that we shall one day rejoice in the dawn of a modern Renaissance, and, as always has been the case, we shall be guided by the fundamental principles of the classic. It will be a modern Renaissance, because it will be characterized by the conditions of modern life. It will be the work of the Renaissance architect solving new problems, adapting his art to an honest and natural treatment of new materials and of new conditions. Will he not also be unconsciously influenced by the twentieth century spirit of economy and by the application of his art to all modern industries and speculations?

Only when we come to recognize our true historic position and the principles of continuity in history, when we allow the spirit of our life to be the spirit of our style, recognizing, first of all, that form and all design are the natural and legitimate outcome of the nature or purpose of the object to be made—only then can we hope to find a real style everywhere asserting itself. Then we shall see that consistency of style which has existed in all times until the present generation; then, too, shall we find it in every performance of man's industry, in the work of the artist or the artisan, from the smallest and most insignificant jewel or book cover to the noblest monument of human invention or creation, from the most ordinary kitchen utensil to the richest and most costly furniture or painted decoration.

We must all work and wait patiently for the day to come when we shall work in unison with our time. Our Renaissance must not be merely archæological — the literal following of certain periods of the style. To build a French Louis XII or Francis I or Louis XIV house, or to make an Italian cinquecento design, is indisputably not modern architecture. No architect until our times slavishly followed the characteristics of any particular period, but he used all that he could get from what preceded him, solving such new problems as were the imperatives of his position.

What did a man like Pierre Lescot, the architect of the Henry II Court of the Louvre, endeavor to do? It would have been impossible for him actually to define the style of his own period. That is for us, his successors, to do. For him the question was how to meet the new demands of contemporaneous life. He studied all that he could find in Classic and Renaissance precedents applicable to his problem. He composed, never copying, and always with that artistic sense of the fitness of things which was capable of realizing what would be harmonious in his work. In the same way all architects, at all times, contributed to a contemporaneous architecture, invariably with modifications to meet new conditions. This must be done with a scholarly appreciation of that harmonious result which comes only from a thorough education. So, with freedom of the imagination and unity of design, an architecture is secured expressive of its time.

Again, as in all times until now, there will be design and not mere novelty in the carriage, automobile, or boat, as well as in the endless variety of implements of utility or amusement.

How is it with us in modern times? Not only do many architects slavishly follow the character of some selected period, but they also deliberately take entire motives of composition from other times and other places to patch and apply them to our new conditions and new life. Every man's conscience must speak for itself as to whether such plagiarism is right; but while the moral aspect of this question has very little to do with art, yet intellectually such imitative work, though seemingly successful, positively stifles originality, imagination, and every effort to advance in the right direction.

The way is now prepared for us to endeavor to indicate what are some of the principal causes of the modern confusion in style. With us Americans an excessive anxiety to be original is one of the causes of no end of evil. The imagination should be kept under control by given principles. We must have ability to discern what is good among our own creations and courage to reject what is bad. Originality is a spontaneous effort to do work in the simplest and most natural way. The conditions are never twice alike; each case is new. We must begin our study with the floor plan and then interpret that floor plan in the elevation, using forms, details, and sometimes motives, with natural variations and improvements on what has gone before. The true artist leaves his temperament and individuality to take care of themselves.

Some say that if this is all that we are doing there is nothing new in art; but if we compose in the right way there can be nothing that is not new. Surely you would not condemn nature for not being original because there is a certain similarity between the claw of a bird and the foot of a dog, or between the wing of a bird and the fin of a fish. The ensemble of each creature is the natural result of successive stages of life, with variations of the different parts according to the principles of evolution. There are countless structural correspondences in the skeletons of organic life, but these show the wonderful unity of the universe; and yet, notwithstanding this unity, nature is flooded with an infinite variety of forms and species of life.

We must logically interpret the practical conditions before us, no matter what they are. No work to be done is ever so arbitrary in its practical demands but that the art is elastic and broad enough to give these demands thorough satisfaction in more than a score of different ways. If only the artist will accept such practical imperatives as are reasonable, if only he will welcome them, one and all, as friendly opportunities for loyal and honest expression in his architecture, he will find that these very conditions will do more than all else besides for his real progress and for the development of contemporaneous art in composition.

Never resent what at first thought may seem to be limitations and in despair try to change conditions which, if reasonable, should suggest new and interesting design. Frederick the Great said: "The great art of policy is not to swim against the stream, but to turn all events to one's own profit. It consists rather in deriving advantage from favorable conjunctures than in preparing such conjunctures." And when told of the death of the Emperor Charles VI, he said to a friend who was with him: "I give you a problem to solve: When you have the advantage, are you to use it or not?"

The architects in the early history of America were distinctly modern and closely related in their work to their contemporaries in Europe. They seem not only to have inherited traditions but religiously to have adhered to them. I believe that it is because of this that the genuine and naïve character of their work, which was of its period, still has a charm for us which cannot be imitated. McComb, Bulfinch, Thornton, Latrobe, L'Enfant, Andrew Hamilton, Strickland, and Walters were sufficiently American and distinctly modern, working in the right direction, unquestionably influenced by the English architecture of Inigo Jones, Sir Christopher Wren, James Gibbs, Sir William Chambers, and others. Upjohn and Renwick, men of talent, were misled, alas, by the confusion of their times, the beginning of this modern chaos, the so-called Victorian-Gothic period.

Gifted as Richardson was, and great as was his personality, his work is always easily distinguished, because of its excellent quality, from the so-called Romanesque of his followers. But I fear the good he did was largely undone because of the bad influence of his work upon his profession. Stumpy columns, squat arches, and rounded corners, without Richardson, form a disease from which we are only just recovering. McComb and Bulfinch would probably have frowned upon Hunt for attempting to graft the transitional Loire architecture of the fifteenth century upon American soil, and I believe that all will agree that the principal good he accomplished was due to the great distinction of his art and to the moral character of the man himself rather than to the general influence and direction of his work.

Whether we agree with Charles F. McKim or not in wanting to revive in the nineteenth century the Italian Renaissance of the sixteenth century, the art of Bramante, San Gallo, and Peruzzi, he had perhaps more of the true sense of beauty than any of his predecessors in American art. His work was always refined, individual, and had a distinctly more classic tendency in his most recent buildings. We have seen that the life of an epoch makes its impress upon its architecture. It is equally true that the architecture of a people helps to form and model its character, in this way reacting upon it. If there be beauty in the plans of our cities and in the buildings which adorn our public squares and highways, its influence will make itself felt upon every passer-by. Beauty in our buildings is an open book of involuntary education and refinement, and it uplifts and ennobles human character. It is a song and a sermon without words. It inculcates in a people a true sense of dignity, a sense of reverence and respect for tradition, and it makes an atmosphere in its environment which breeds the proper kind of contentment, that kind of contentment which stimulates true ambition. If we would be modern, we must realize that beauty of design and line construction build well, and with greater economy and endurance than construction which is mere engineering. The qualitative side of a construction should first be considered, then the quantitative side. The practical and the artistic are inseparable. There is beauty in nature because all nature is a practical problem well solved. The truly educated architect will never sacrifice the practical side of his problem. The greatest economic as well as architectural calamities have been performed by so-called practical men with an experience mostly bad and with no education.

It is, I believe, a law of the universe that the forms of life which are fittest to survive—nay, the very universe itself—are beautiful in form and color. Natural selection is beautifully expressed, ugliness and deformity are synonymous; and so it is in the economy of life—what would survive must be beautifully expressed.

Has the world beheld in art that which we call style, changing with each age, the visible expression of man's inner consciousness, appearing above the horizon with the dawn of civilization, gradually developing in orderly sequence, one degree upon another, following the course of time? Has all this come into existence only to disappear again on the other side of the small circle of its horizon? Has history recorded its progress from dawn to twilight, unconscious of its rapid fading into the darkness of night? Or will it rise again following the natural laws of the universe? Or, like the falling star, is it lost in the confusion of eternal space, never to appear again?

As each age tells its own story in its own language, shall we tell our story to future generations in our own way? A great tide of historic information has constantly flowed through the channel of monuments erected by successive civilizations, the art of each age being an open book recording the life and spirit of the epoch, ofttimes verifying the truth of its own literature, an integral part of the whole scheme of evidence. The archæologist thus supplements the historian, but alas, with the chain divided, the future will have drifted away from the past into a vast ocean of discord, where architectural continuity will have ceased to exist.

The recently discovered buried cities of Assyria give us a vivid idea of the civilization lost to history. The pyramid of Cheops and the temples of Karnak and Luxor tell us more of that ingenuity which we cannot fathom and of the grandeur and life of the Egyptian people than the scattered and withered documents or fragments of inscriptions that have chanced to survive the crumbling influences of time.

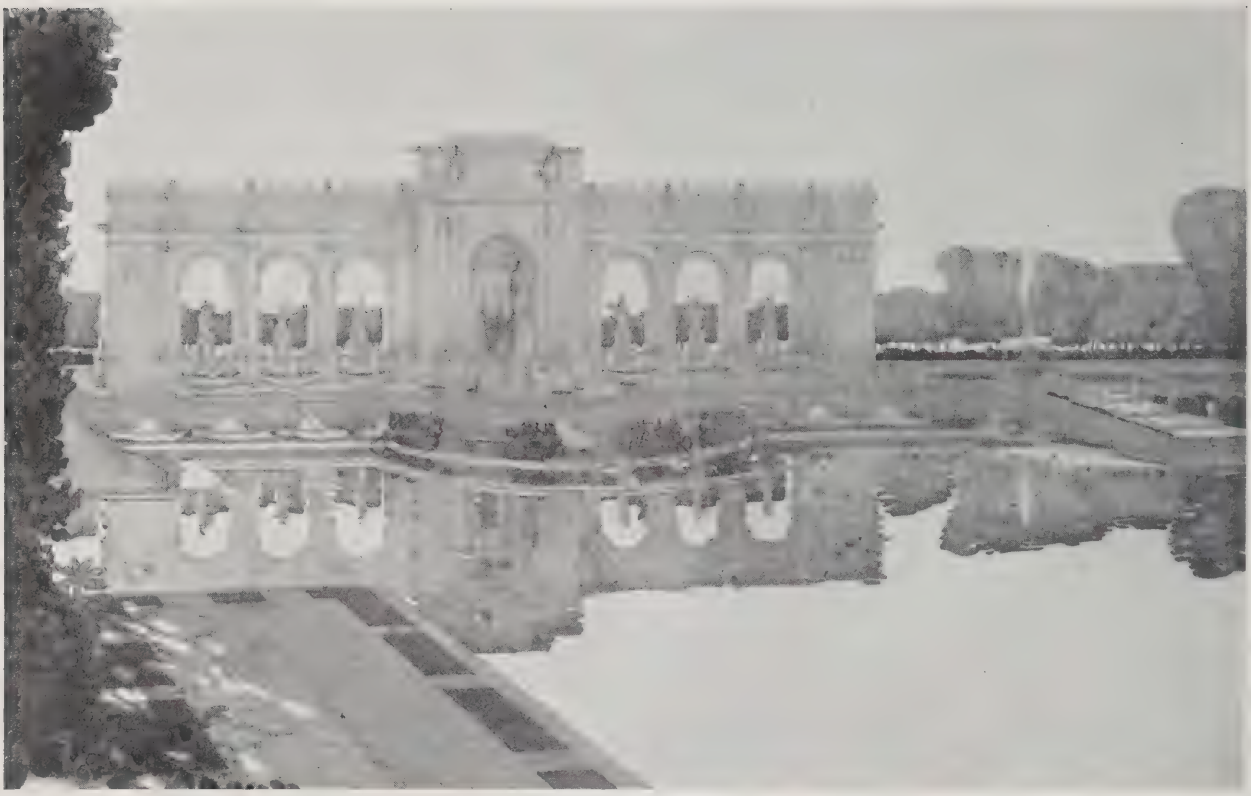
The Parthenon and the Erectheum bespeak the intellectual refinement of the Greeks as much as their epic poems or their philosophy. The triumphal arches, the aqueducts, the Pantheon, and the basilicas of Rome tell us more of the great constructive genius of the early republic and the empire of the Cæsars than the fragmentary and contradictory annals of wars and political intrigues. The unsurpassed and inspiring beauty of the Gothic cathedrals which bewilder us, and the cloisters which enchant us, impress on our minds a living picture of the feverish and morbid aspirations of mediæval times, a civilization that must have had mingled with its mysticism an intellectual and spiritual grandeur which the so-called dark ages of the historians have failed adequately to record; and in America, even amid the all-absorbing work of constructing a new government, our people found time to speak to us, of today, in the silent language of their simple Colonial architecture of the temperament and character of our forefathers.

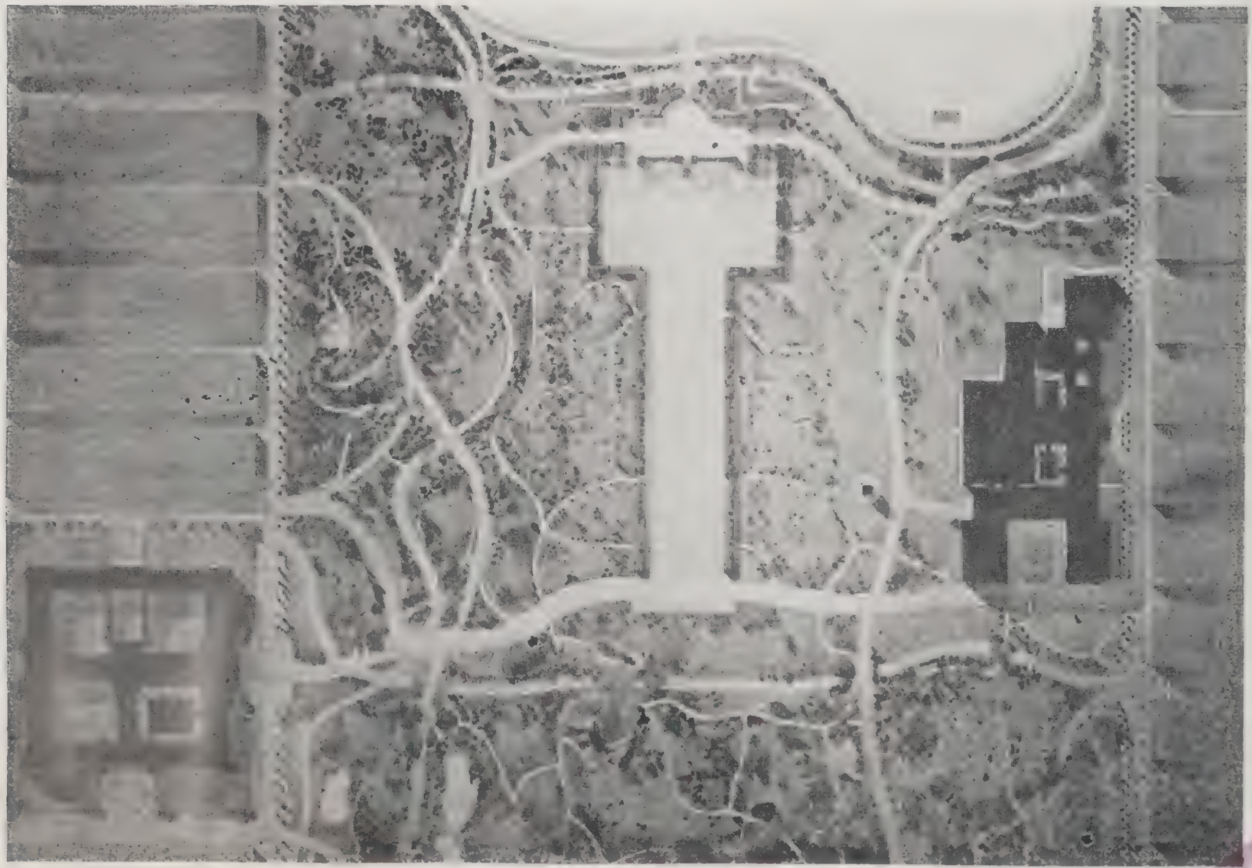
And when in the tumult of this modern warfare men's passions overcome their reason, and the great monuments of history that have survived the ages are subjected to the onslaught of modern armament, let us hope that they may not be further subjected to the work of the architect who would fain restore them in the style which has passed and so rob us of all that is left. Let them be protected by every device from further destruction, to tell the story of this twentieth century civilization, this vaunted culture which has failed to respect and protect its heritage.

Will our monuments of today adequately record the splendid achievements of our contemporaneous life, the spirit of modern justice and liberty, the progress of modern science, the genius of modern invention and discovery, the elevated character of our institutions? Will disorder and confusion in our modern architectural styles express the intelligence of this twentieth century? Would that we might learn a lesson from the past—that modern architecture wherever undertaken, might more worthily tell the story of the dignity of this great epoch and be more expressive of our contemporaneous life!

# Design and Plan of War Memorial, Central Park

THOMAS HASTINGS, Architect





# The Proposed War Memorial for New York

*By* THOMAS HASTINGS

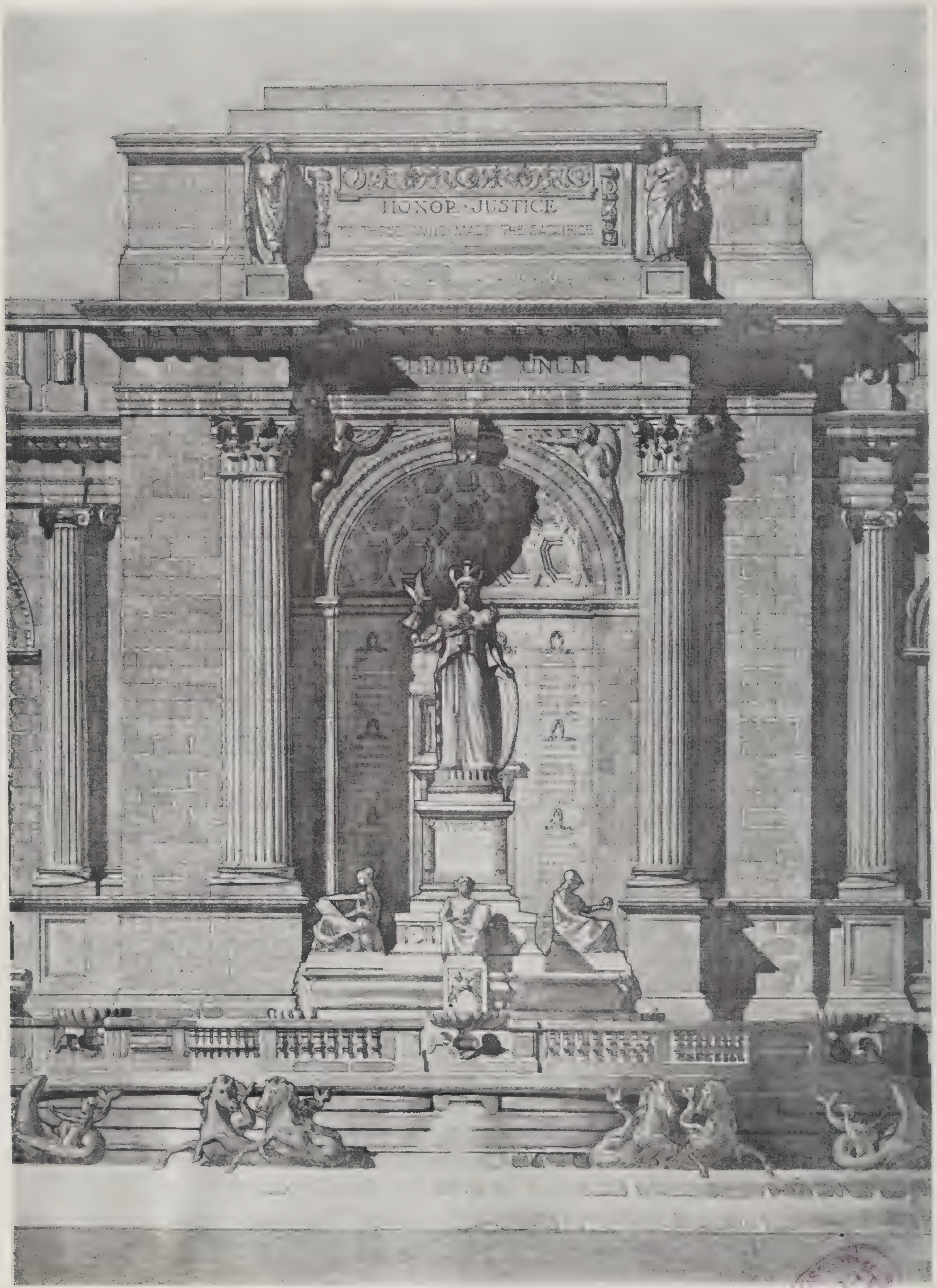
WHEN I was requested to make plans for the proposed War Memorial on the site of the lower reservoir, I consented to undertake the work only on condition that a committee of architects, landscape architects and sculptors might be appointed to determine upon the design and the propriety of the undertaking, with a view to protecting the public from the one-man idea, *whether city official, architect, selfishly interested, or newspaper editor.*

As a mere method of selection, the presidents of the different architectural and sculptural societies were invited to act on the advisory committee; in this way six unprejudiced men of ability were appointed, understanding that they were acting only as individuals. They unanimously agreed upon two of the ablest and best known landscape architects to add to their number. After long and serious study and a thorough consideration of both propriety and design, they unanimously voted in favor and without a dissenting voice. First, they seriously considered the possible influence of the monument upon the landscape of the park itself and the likelihood of its location there becoming an entering wedge for the placing of other monuments in the park. All agreed, however, that it was *too* evident that no encroachment was contemplated, but that on the contrary securing an addition of approximately 37 acres of land would be a splendid accomplishment and could be obtained only in some such way as that now under consideration. All were primarily interested in taking advantage of this splendid opportunity which may never occur again to bring about the removal of the rigid walls of the reservoir in order to add this large area to our park system, admittedly inadequate for our increased population.

It was observed that this reservoir which never has been a part of the park and is now practically out of use, with its high structural walls built long before the park was contemplated, would some day not far away, with the westerly extension of the museum already planned, form a canyon of architectural construction, completely obliterating the picturesque and rural character of the east side drive. All agreed, therefore, upon the removal of the high walls and upon a simple informal treatment of the entire area with a narrow central lagoon not as large as the mall leading to the proposed monument, placed at the northerly end where now stands a wooden cottage which already occupies about as many square feet of land as would be taken by the proposed monument. This cottage is now practically secluded, and the monument would be equally secluded from all parts of the present park, to be seen only from viewpoints within the area of the newly created park addition; i.e., the monument will not be in the present park or influence its design excepting to increase very largely its present area. Finally, the choice of this site was considered to be better than any other contemplated, every possible suggestion having been considered, because of its central location geographically and as regards population, and more particularly because here it could make its own atmosphere, and the character, dignity, and solemnity of its design could never be influenced or diminished by tall buildings, commercial or domestic, or by any other kind of encroachments.

The city officials in charge of the Memorial, the committee of experts, the Park Department, and the Municipal Art Commission, have all without one dissenting voice approved the undertaking. When the Park Commissioner submitted his report with his approval to the Art Commission, this committee of artists and distinguished laymen gave the entire matter its most conscientious consideration; it visited the site, studied the drawings, made helpful suggestions, and finally gave its unanimous and unqualified preliminary approval, which necessarily includes the approval of the propriety of the undertaking, asking for models and further information in order to give its final approval of the structure itself. It would be difficult to explain at length how seriously everything has been considered and how much enthusiasm has been expressed by artists, defenders and friends of the park, intelligent laymen.

With this explanation I hope there may be no further thought on the part of anyone to obstruct an undertaking to which so many have freely and unselfishly contributed their time and thought in solving this most interesting problem as a permanent expression of our gratitude to the youth of our country who have made the supreme sacrifice. Why not encourage those in authority and those who are giving time and expert thought, bearing the responsibility of so serious an undertaking? Cheap print, affording boundless opportunities to uninformed criticism, has done more harm to art in my lifetime than all other influences combined. Bryant Park would be on Fifth Avenue today, making a splendid approach to the New York Public Library, were it not for fear of opposition when we as architects proposed this change of program. The artist knows exceptions to all rules, while the journalist is too often chained to his journalistic policies when once expressed in the columns of his paper. In this way he becomes an obstructionist sometimes without realizing it. If he would only undertake to give the public much-needed constructive suggestions, in consultation with expert advice, much good might be accomplished in the betterment of our city parks; I refer more especially to our smaller parks and squares. They were all designed in the period of the brownstone, high stoop house and the *gilt engraved* walnut furniture, the worst of American art.


HONOR · JUSTICE
TO THOSE WHO MADE THE SACRIFICE
E PLURIBUS UNUM

CENTRAL MOTIF OF PROJECTED WAR MEMORIAL
TO BE PLACED ON SITE OF PRESENT LOWER RESERVOIR, CENTRAL PARK
THOMAS HASTINGS, ARCHITECT

cept that walnut instead of pine boards were used to give an Italian effect to the interior. When such a floor was subjected to fire test of 1700° for over an hour, the wood construction fully protected on the underside was safely able to maintain its designed load for that period.

A View of the Loggia from One End
Italian influence indicated in every architectural detail

The garage, being attached to the house, was separated from it as advocated in the Hoover Committee Small House Code by a fire-protected wood stud partition and wood joisted floor. This code also recommended that where glass windows occur in garages, such windows should have metal frames and wire glass. This feature was also adhered to, as well as the suggestion that where possible there should be no direct entrance from the garage into the house. This is accomplished by planning the house so that the rear entrance door is close by the garage door, avoiding any direct connection.

While the house was designed to show that structural members could be of wood and yet be made fire-safe, wood trim was largely eliminated to conform with the Italian style of decoration. Through the main portion of the house plaster reveals, marble window sills and steel screens aided in eliminating combustible material. Wherever non-bearing partitions were necessary, solid 2-inch metal lath and plaster partitions on steel studs were used. The fireplace and flue linings and chimney, together with the wood framing around it, were designed in accordance with the recommended practice of the National Board of Fire Underwriters.

Main Entrance, Balcony and Loggia

The plaster on the walls and ceilings of the entire house is reinforced by expanded metal lath, primarily for its crack- and fire-resisting qualities. Such a base is especially good if the architect attempts use of the typical sand-finished plaster of the Italian style. Although the interior structural wood of this house is safe against the rapid spreading of fire, a factor of safety that every home owner is entitled to, the exterior fire protection is also considered in this model house. The roof has been covered with variegated clay tile, making it impossible for firebrands or sparks to injure the roof, and the wood studs of the exterior walls have been covered with stucco on wire lathing, both on the exterior face and on the back of the lath between the studs. This method, termed "back-plastering," not only forms a scientific reinforcement of the stucco, but also requires a thicker stucco coat having correspondingly greater crack resistance as well as completely sealing the lath against exposure to atmospheric conditions.

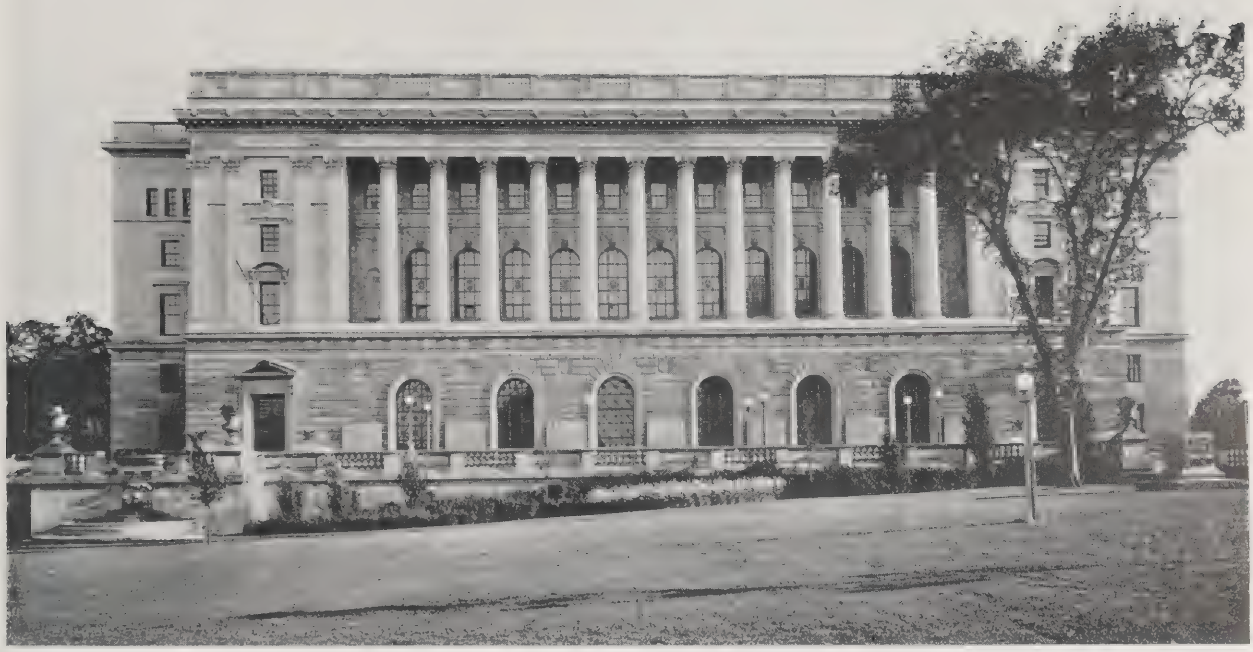
The Surface Treatment Committee of the American Concrete Institute has pointed out that successful stuccoing can only be expected by following certain well defined structural methods, the neglect of which will cause disappointment. Among these points the wrapping of brick chimneys with metal fabric for stucco as reinforcement, in such exposed positions as have alternating extremes of temperature, is very essential to permanence. In order that water may not get down behind the stucco, a solid concrete or other impervious chimney cap with a definite drip is necessary to overhang it. The flashing of all vertical surfaces, where they stop at horizontal or inclined surfaces, is an essential detail for the permanence of stucco. Such surfaces in the case of this house occur where the wall over the doorway stops at the balcony level and where the high gable wall stops at the lower roof over the garage. Metal flashings were used at all these places and also in the form of small squares tacked to the end of every window sill and every horizontal piece of projecting wood, thus preventing concentration of water at the ends of these members and avoiding the unsightly and totally unnecessary "tear stains" so often seen in even first class residential construction. Metal flashings were also put over all exposed horizontal wood members and underneath the joints of the wood cap at the top of the loggia walls to prevent water from seeping through between the adjacent pieces of wood and staining or getting behind the stucco at these points. Metal rain water leaders and gutters have also been used to insure against any stains from roof drippings. The more general employment of metal flashing as described here on stucco residences would improve their appearance tremendously without much additional cost.

One of the principal recommendations of the American Concrete Institute Committee on Surface Treatment is that the stucco should not extend to the ground, but that a solid course of brick should be inserted or that the masonry wall should extend up about 12 inches. This recommendation is wise, for earth stains at the base of the stucco and the disintegration from capillary attraction are detrimental to the permanency and good looks of stucco. In careful hands, however, stucco can be run to the ground as in this Italian type of architecture, where the construction was sacrificed to assist the design; it was overcome by mopping the cement wall with a prepared waterproofing compound to prevent capillary attraction, and by inserting a projecting sill of thoroughly painted wood set on waterproofed building paper, upon which the stucco was stopped 2 inches above the grade line.

The elimination of the wood sheathing in the back-plastered method here employed calls for consideration of insulation which has been a subject of thermal conductivity tests at Armour Institute for various kinds of walls. Following these tests, felt secured to the inside faces of the studs and bellied into the hollow spaces between them was used, with the result that even when the heat in the house is shut off for the night and the thermometer registers zero outside, the house temperature loss over night is said to be only about eight degrees, showing exceptional insulative efficiency.

As an example of modern scientific construction advocated by far-sighted committees and institutions, which utilizes these methods of protection from fire and weather, lacking in the average wood-framed residence, this house is a definite step ahead in the development of protective and preservative architecture. The findings of our investigational committees need not be discarded as theoretical or impractical for architectural use when they can be carried out in such a manner as illustrated here.

View of Combination Living and Dining Room



# The Centennial Memorial Building, Springfield, Illinois

By HUGH M. G. GARDEN

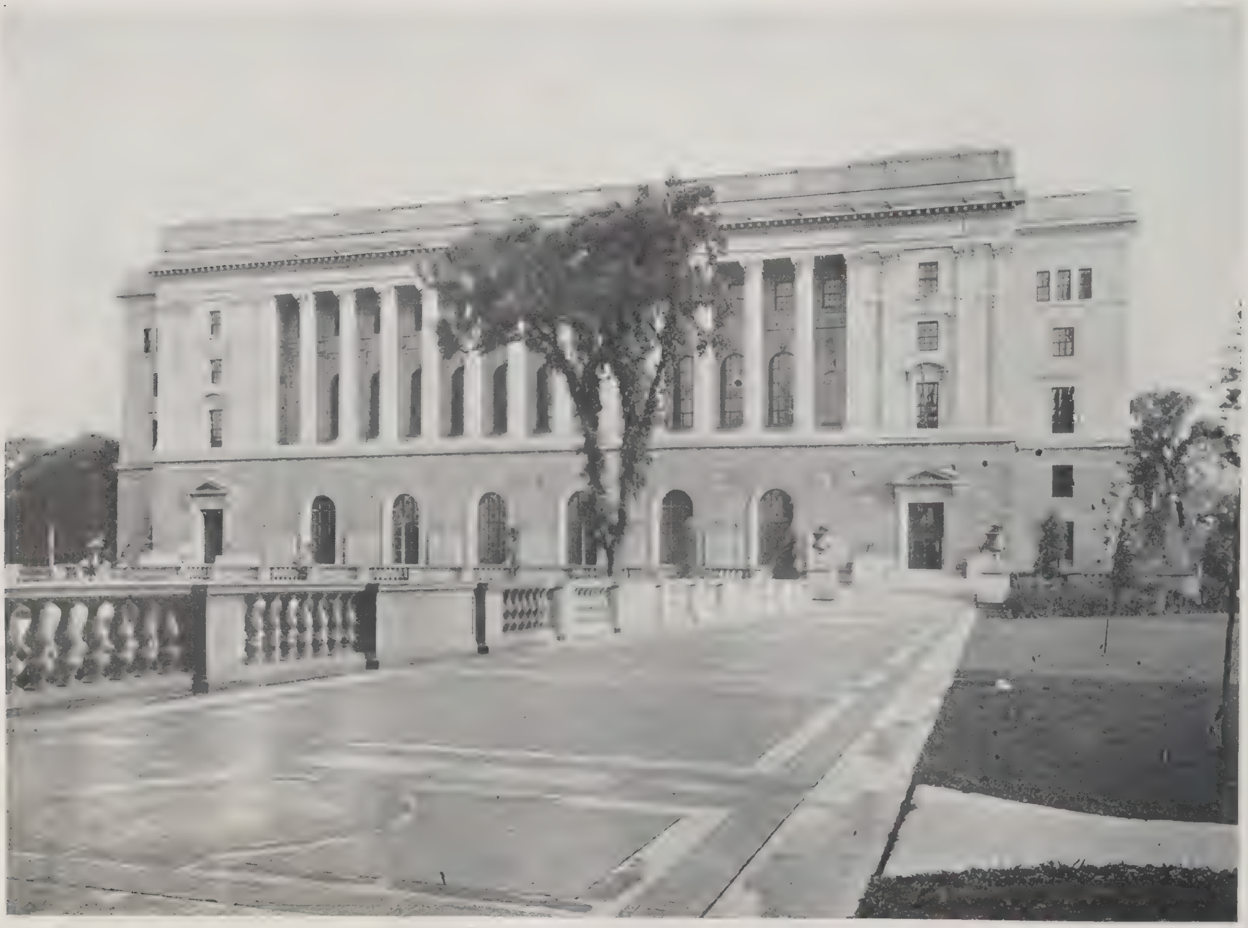
TO plausibly predict the ultimate future growth of the buildings that will be required to house the governmental machinery of any one of the great states of the Union requires a considerable degree of foresight. Fifty years ago, when the present capitol building at Springfield was erected, the citizens of Illinois looking aloft at its imposing dimensions and ambitious pretensions may reasonably have felt that at last they were through with at least one great task. Yet so inadequate has it proved in the face of the growth of the state and the functions of the state government that one by one important departments have been forced out of the central building, and surrounding property has been acquired to provide sites for inevitable future expansion. The Supreme Court, is now housed in a building of its own on an adjacent corner which is related to the capitol by proximity rather than by architectural treatment. The State Museum is located in an armory converted to its uses, but also unrelated to the central structure. Later it was realized that these were but makeshifts, and the holdings of the state about the capitol were increased to their present dimensions, about eight city blocks, providing sites for at least four large departmental buildings surrounding the capitol, each considerably larger in ground area than the present central structure.

The Centennial Memorial Building, which commemorates the one hundredth anniversary of the admission of the State of Illinois to the Union, forms the central unit of one of these future structures and when completed will form a structure about 300 feet square built around a court, the portion at present completed form-

Grilles Forming Interior Vestibule

View of Terrace and Entrances

ing one side of this square. In planning the Centennial Memorial Building a suggested arrangement was made for the location and form of these future structures comprising the capitol group and at the same time a suggested arrangement in the city plan of Springfield for the principal units of a monumental character including the civic center, the linking up of existing parks and Lincoln's tomb with the civic and state centers. No radical changes from existing street and boulevard plans are included in these suggestions other than the grouping of the two railroad ways that now traverse the city into one. This arrangement if adopted will eliminate the unsightly embankment and bridges that now cut squarely across the west front of the capitol within a city block of the capitol grounds and which now utterly destroy any possibility of making the approach to the capitol from the present center of the city adequate and beautiful. With the removal of this railway and the erection of a building balancing the present Supreme Court structure this approach will be vastly improved and the Supreme Court linked up with the capitol group. The Centennial Memorial flanks the capitol to the south and closes one side of the forecourt. This ground, falling gradually from the capitol to the border-

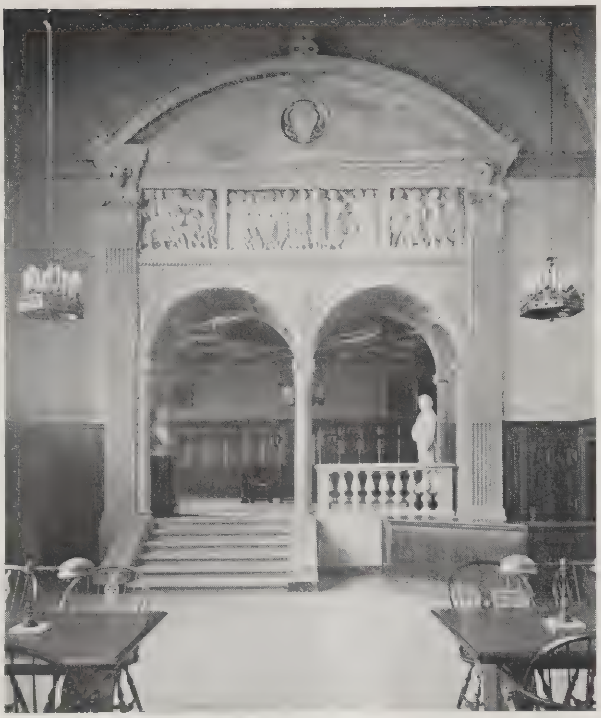


General View, Showing Approach to One of the Main Entrances ing street to the east, naturally involved the creation of a stylobate upon which to erect the Centennial Memorial. This arrangement was expanded to include a balustraded terrace across the front of the Centennial Memorial 55 feet wide and about 320 feet long, the steps leading up to this terrace forming the terminal of the next street to the south from Capitol Avenue, the axial approach from the east. This terrace forms an effective approach to the building and an excellent vantage point from which to view the capitol and its environs.

The Centennial Building houses Memorial Hall, a colonnade stretching across the main front on the first story, in which the historical treasures of the state are preserved and displayed. This hall is terminated at each end by the two entrance lobbies, which are practically extensions of it. In a similar position on the second story are the State Library and the State Historical Library, two separate departments but housed in a single vaulted chamber, the separation accomplished by the introduction of a screen and doors across the center. The book room for these two libraries occupies the entire center of the building from the basement up to the third floor and is expected to provide for an ultimate capacity of about a million volumes.

View of the End Terrace

Fountain Placed Against Retaining Wall of Terrace



End of Reading Room, Historical Library

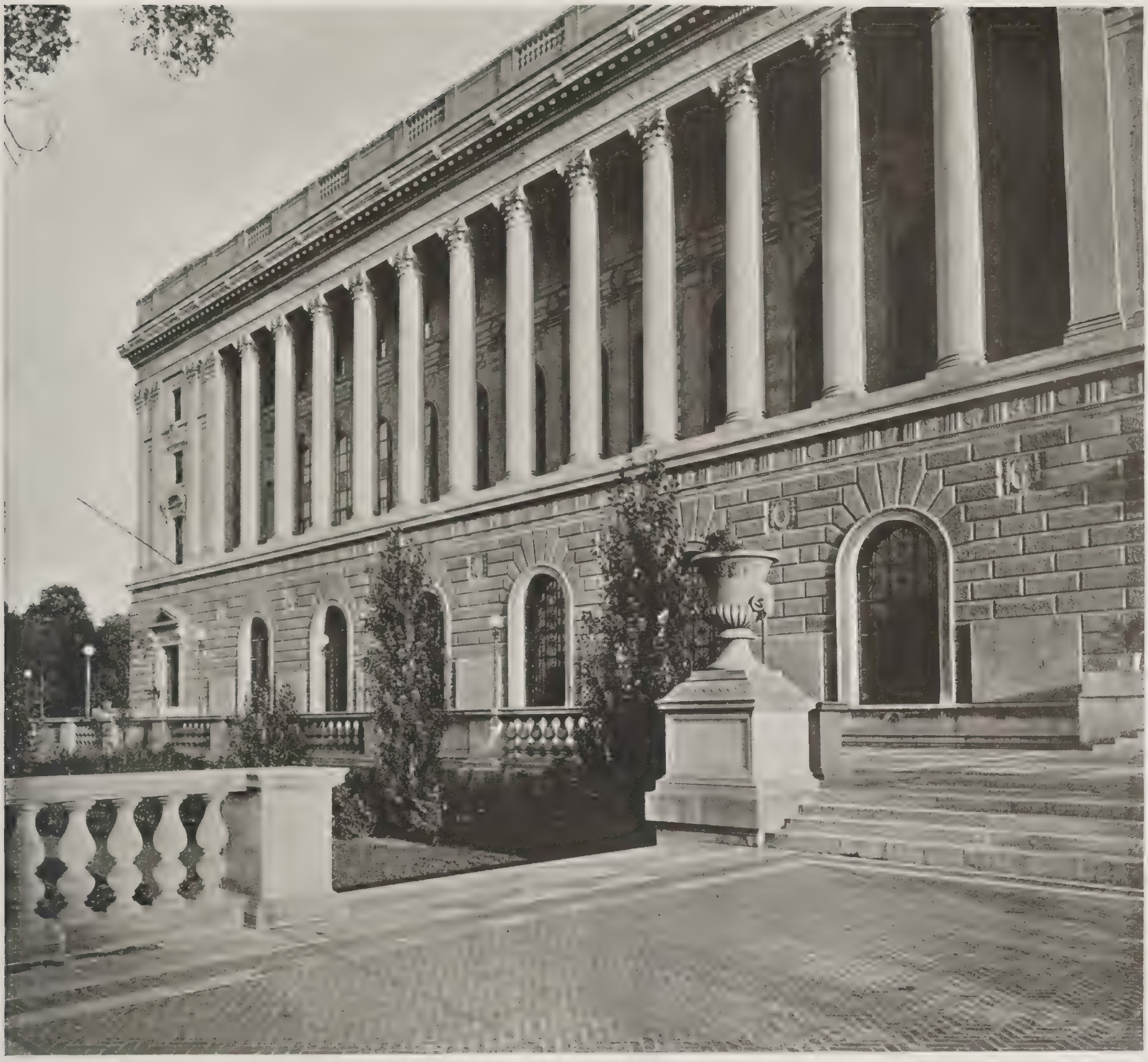
The third main division of the building is the State Museum which occupies the third story. This department will some time be housed, as it should be, in a building devoted only to its purposes. In the second story there is also located the Lincoln Memorial Room, in which are housed personal relics and documents of Abraham Lincoln. On the first story, projecting to the south in what will eventually be the lower part of the court, is a small assembly hall. In addition to these principal departments of the building there are housed a number of offices and minor departments of the state government.

The base of the building is of gray granite, above which the walls are of Indiana limestone. The interior of the entrance lobbies, Memorial Hall, and the adjoining corridors are faced with travertine, with ceilings gilded and polychromed. The flag cases of Memorial Hall are of bronze, and the protecting grilles and gates are of wrought iron. The walls and vault of the Library Reading Room above the walnut bookcases are of texture plaster colored a warm gray, with marble steps and arches at the two entrances.

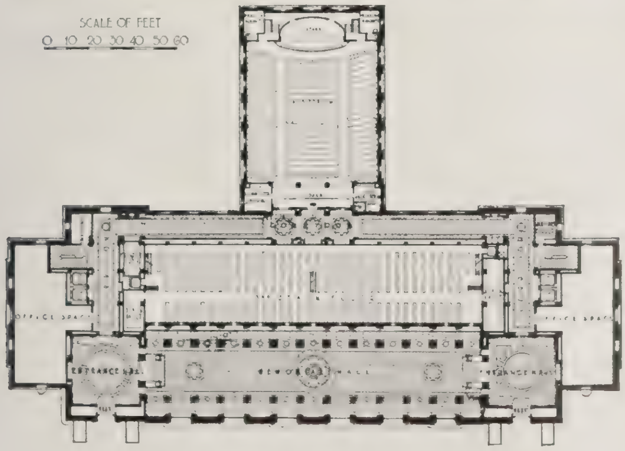
The Lincoln Room is paneled and painted ivory, and is designed in a manner intended to reproduce as nearly as was possible the atmosphere of the more important mansions of central Illinois in Lincoln's time. The decorations on both interior and exterior include escutcheons, emblems and names illustrious in the history of the state, of the territory, and of that larger land once known as the country of the Illinois in the days of the Indian and the French *voyageur,* trapper and missionary, subjects full of romantic interest.

The principal sculptural decorations of the building are yet to be added. These are to consist of bronze groups flanking each of the main entrances and a series of seven large relief panels occupying the wall spaces between the arches of the first story.

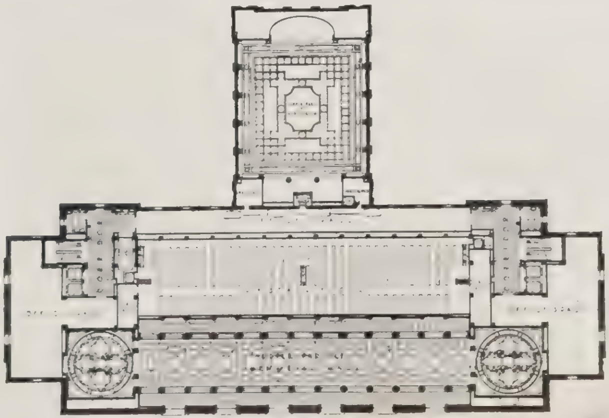
View From Terrace Over Grounds of Centennial Memorial Building



GENERAL VIEW OF BUILDING FROM APPROACH



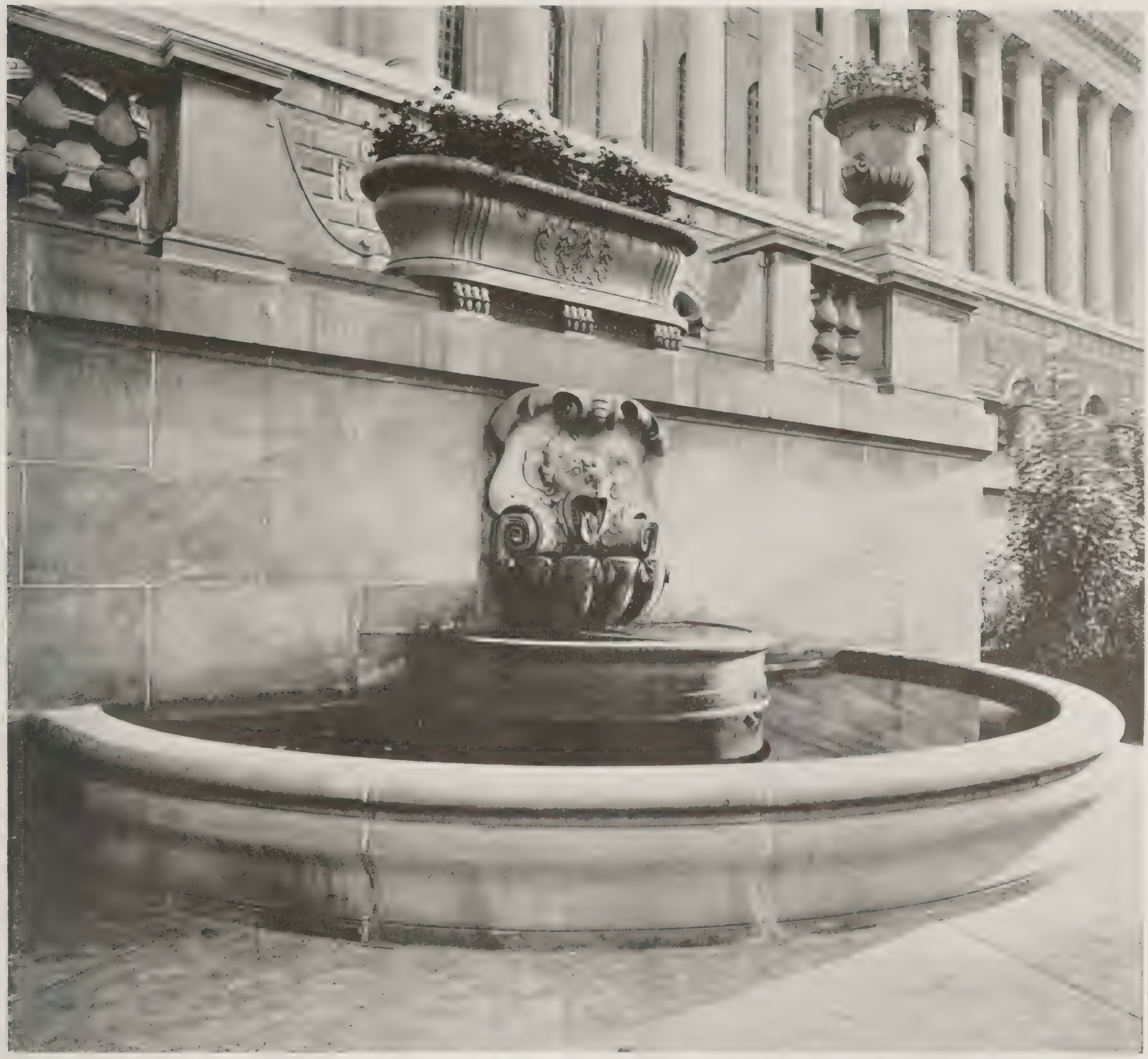
FIRST FLOOR PLAN



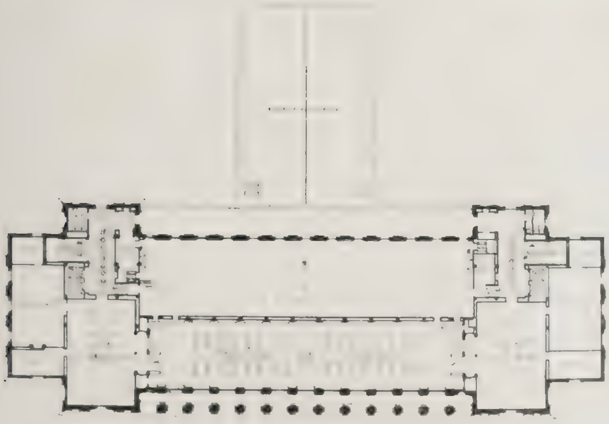
SECOND FLOOR PLAN

## CENTENNIAL MEMORIAL BUILDING, SPRINGFIELD, ILL.

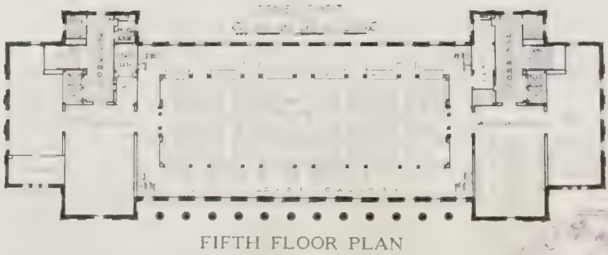
RICHARD E. SCHMIDT & HUGH M. G. GARDEN, ARCHITECTS; EDGAR MARTIN, SUPERVISING ARCHITECT



A FOUNTAIN AGAINST THE TERRACE RETAINING WALL



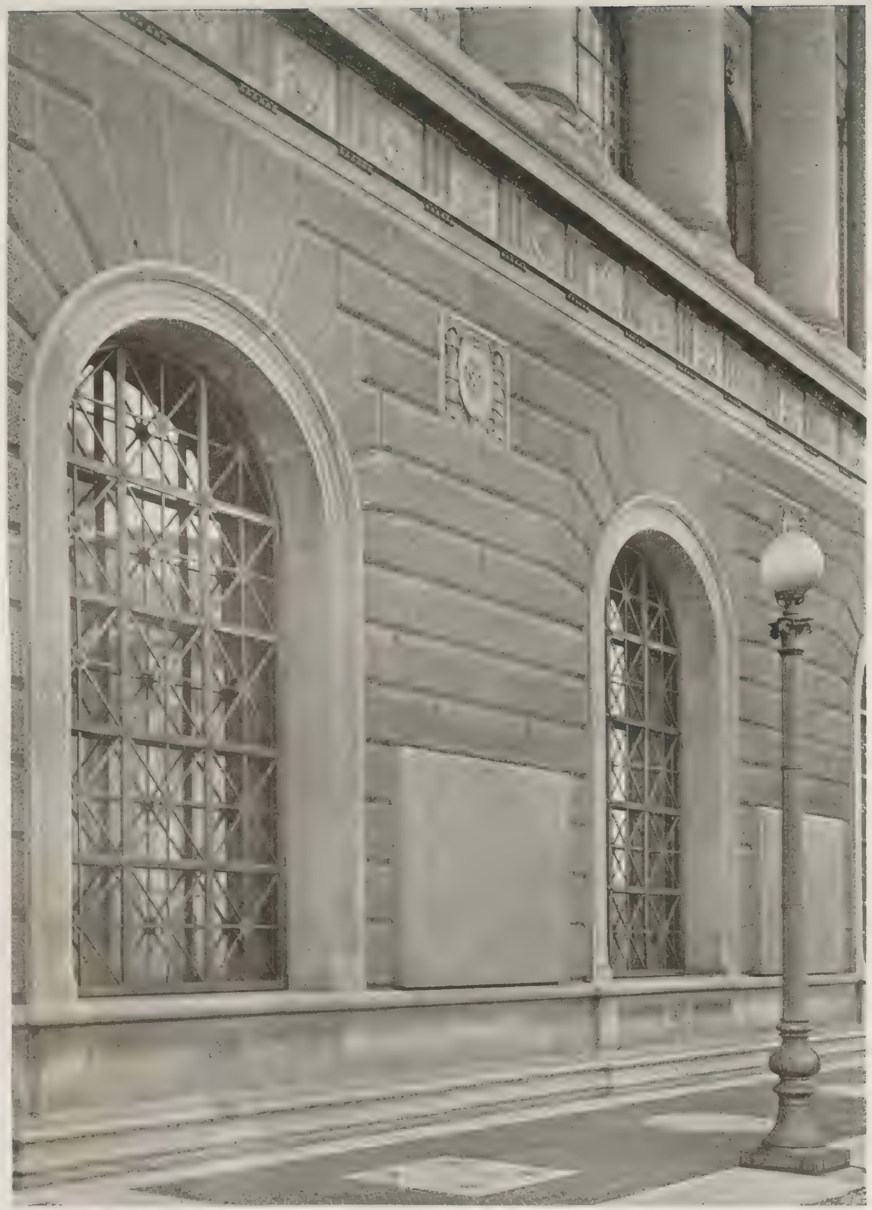
THIRD FLOOR PLAN



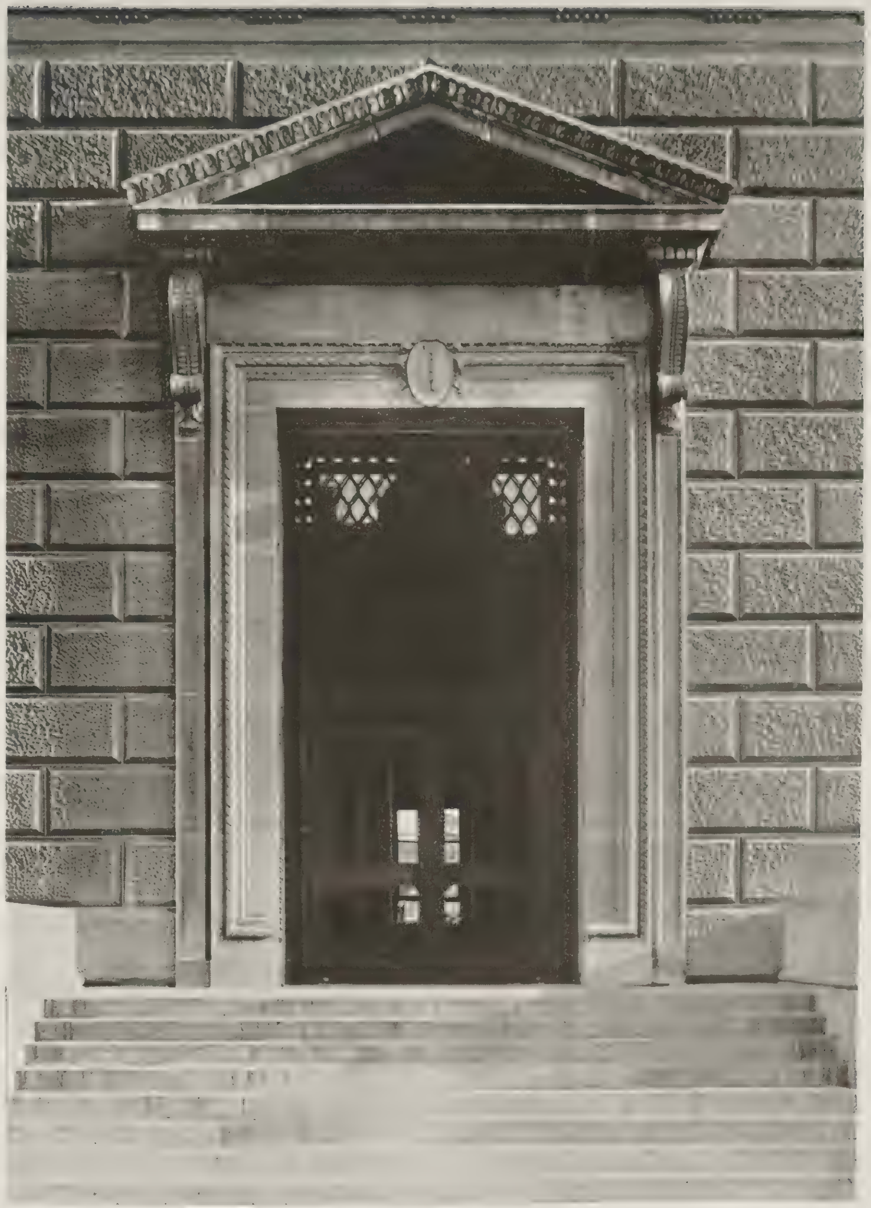
FIFTH FLOOR PLAN

CENTENNIAL MEMORIAL BUILDING, SPRINGFIELD, ILL.

RICHARD E. SCHMIDT & HUGH M. G. GARDEN, ARCHITECTS; EDGAR MARTIN, SUPERVISING ARCHITECT



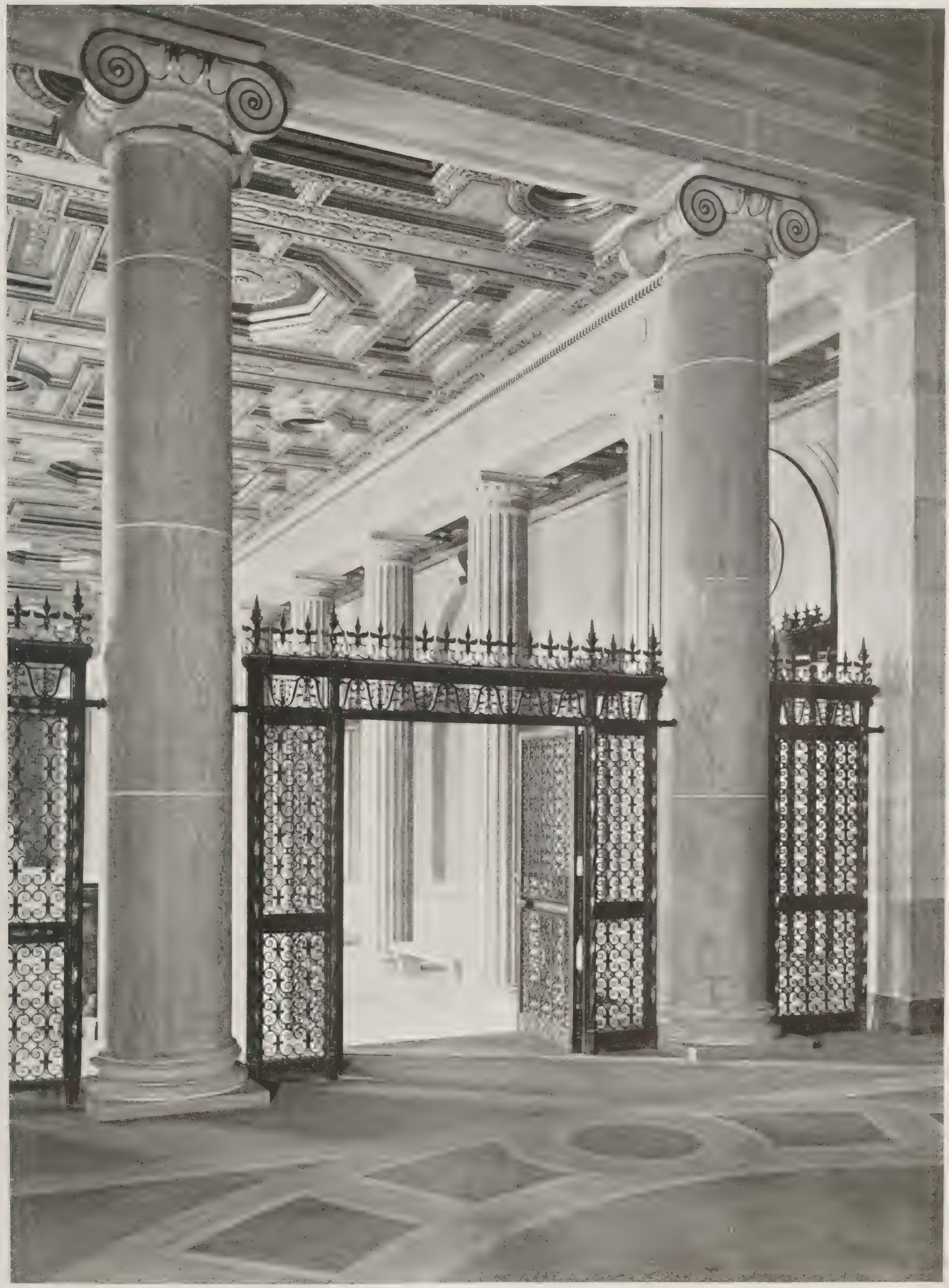
WINDOWS OF MAIN FLOOR, FACING TERRACE



ONE OF THE PRINCIPAL ENTRANCES

CENTENNIAL MEMORIAL BUILDING, SPRINGFIELD, ILL.

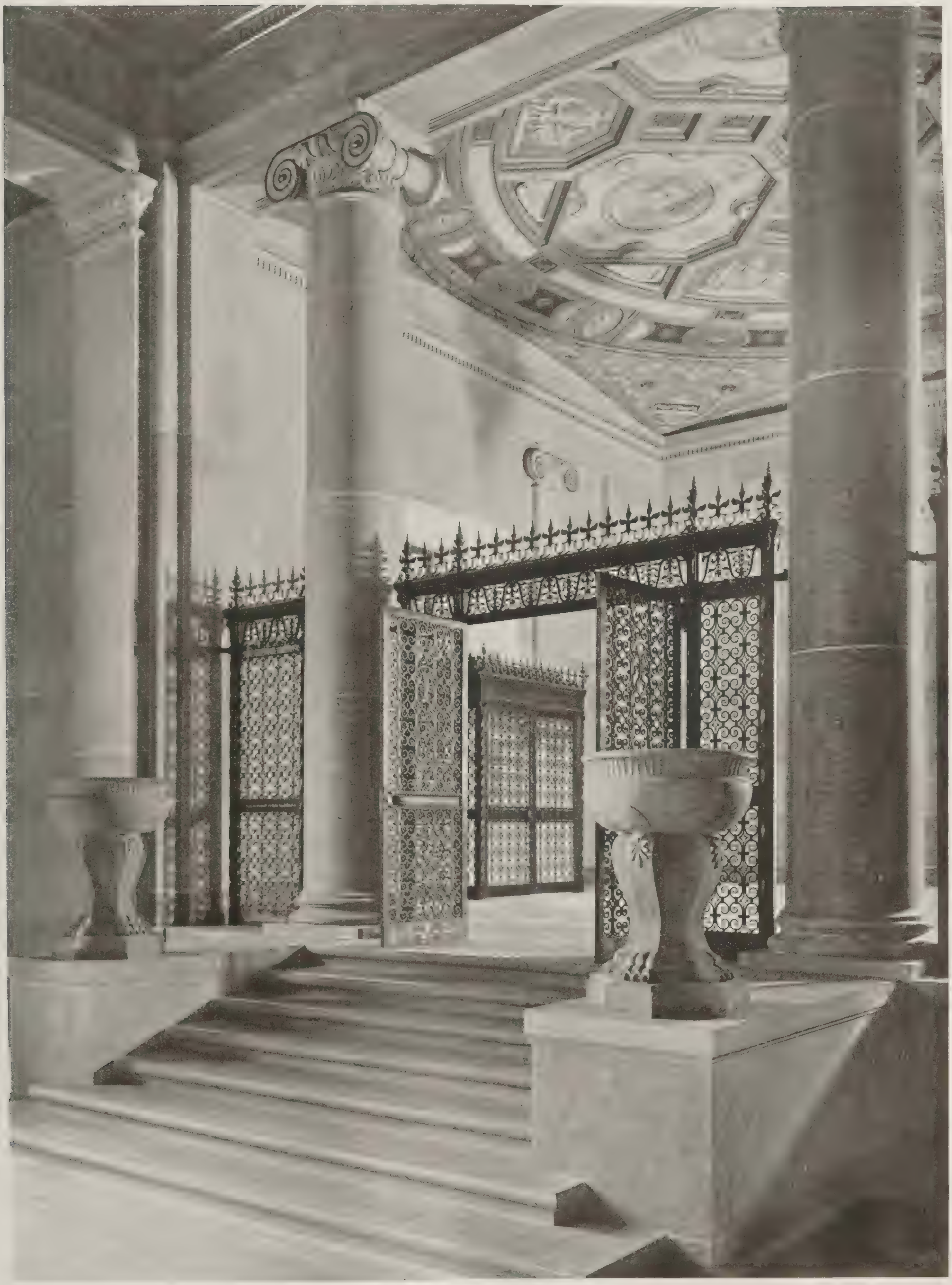
RICHARD E. SCHMIDT & HUGH M. G. GARDEN, ARCHITECTS; EDGAR MARTIN, SUPERVISING ARCHITECT



LOOKING INTO THE GRAND ARMY ROOM

CENTENNIAL MEMORIAL BUILDING, SPRINGFIELD, ILL.

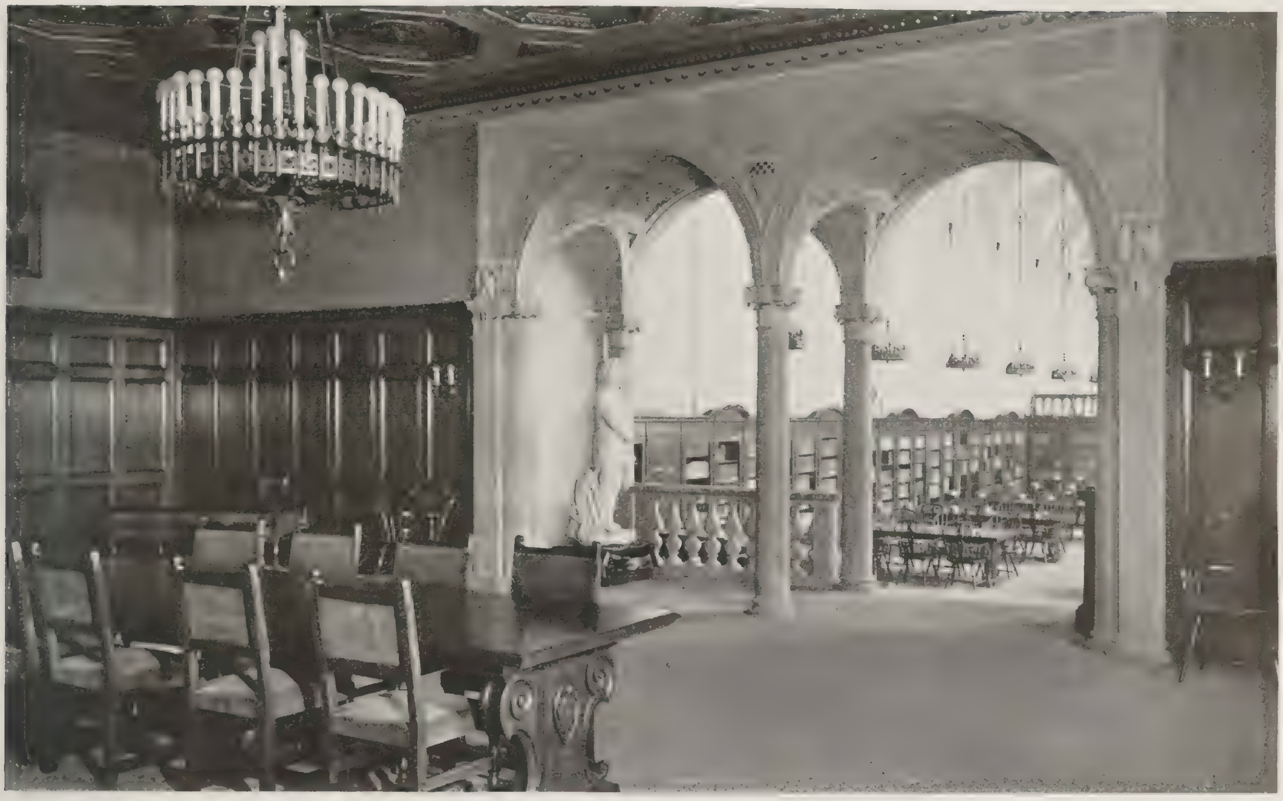
RICHARD E. SCHMIDT & HUGH M. G. GARDEN, ARCHITECTS; EDGAR MARTIN, SUPERVISING ARCHITECT



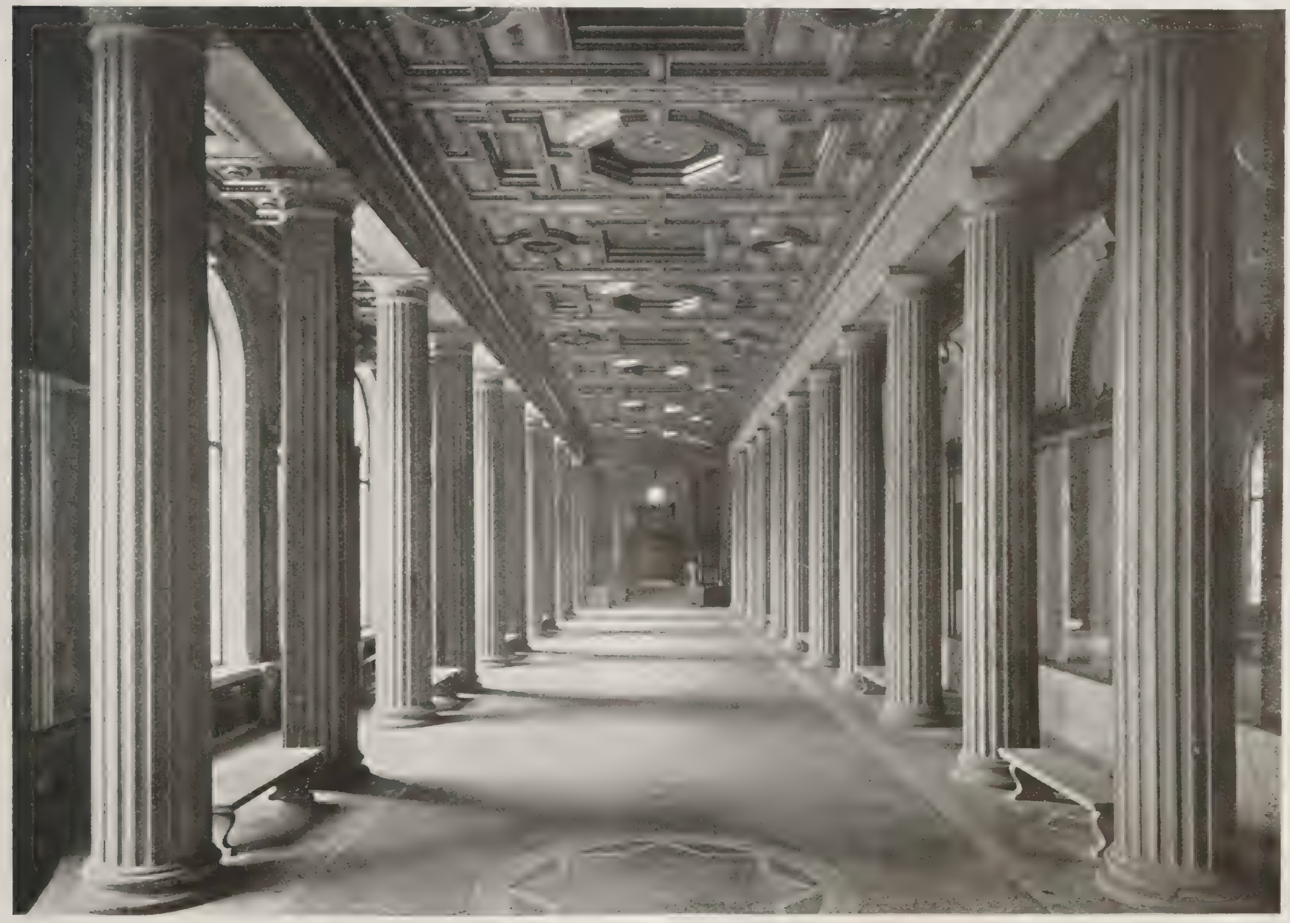
FROM GRAND ARMY ROOM, LOOKING INTO ENTRANCE HALL

CENTENNIAL MEMORIAL BUILDING, SPRINGFIELD, ILL.

RICHARD E. SCHMIDT & HUGH M. G. GARDEN, ARCHITECTS; EDGAR MARTIN, SUPERVISING ARCHITECT



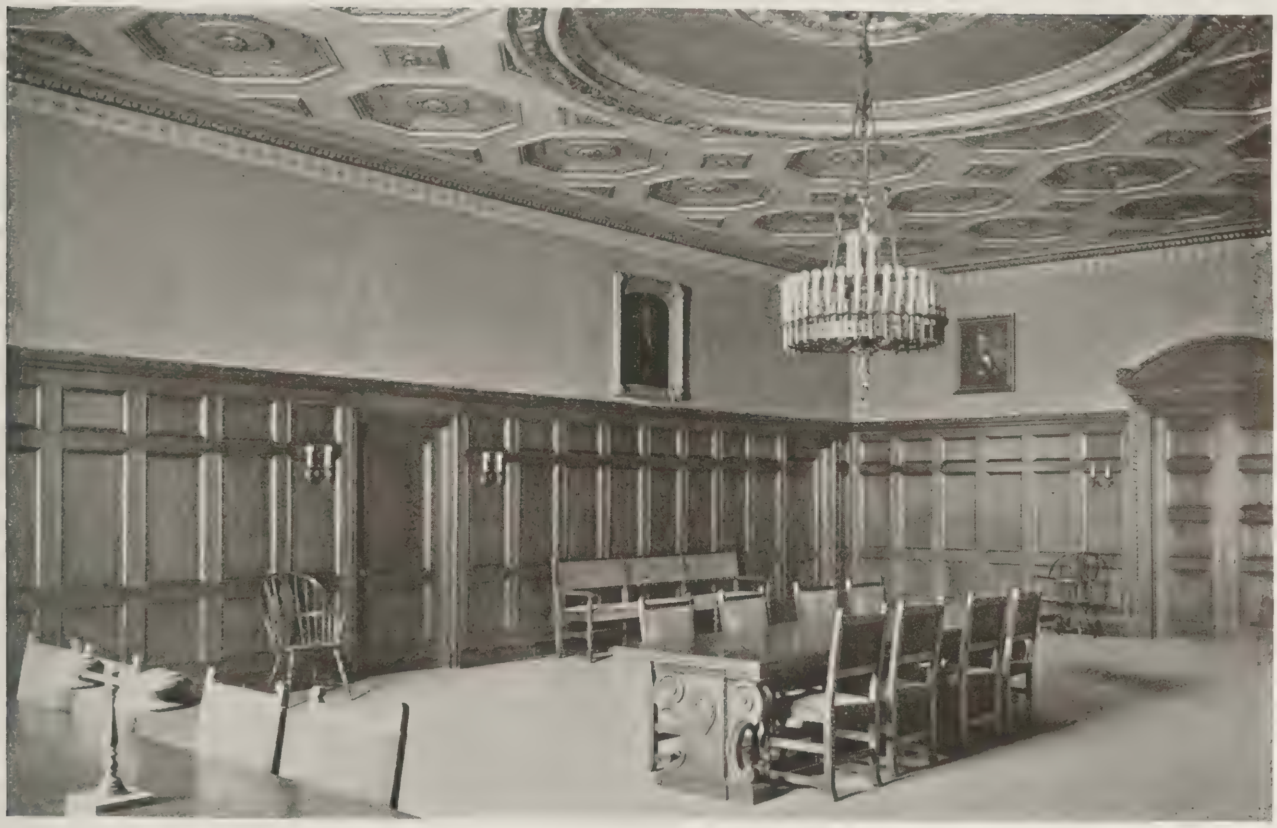
ANTE ROOM AND READING ROOM



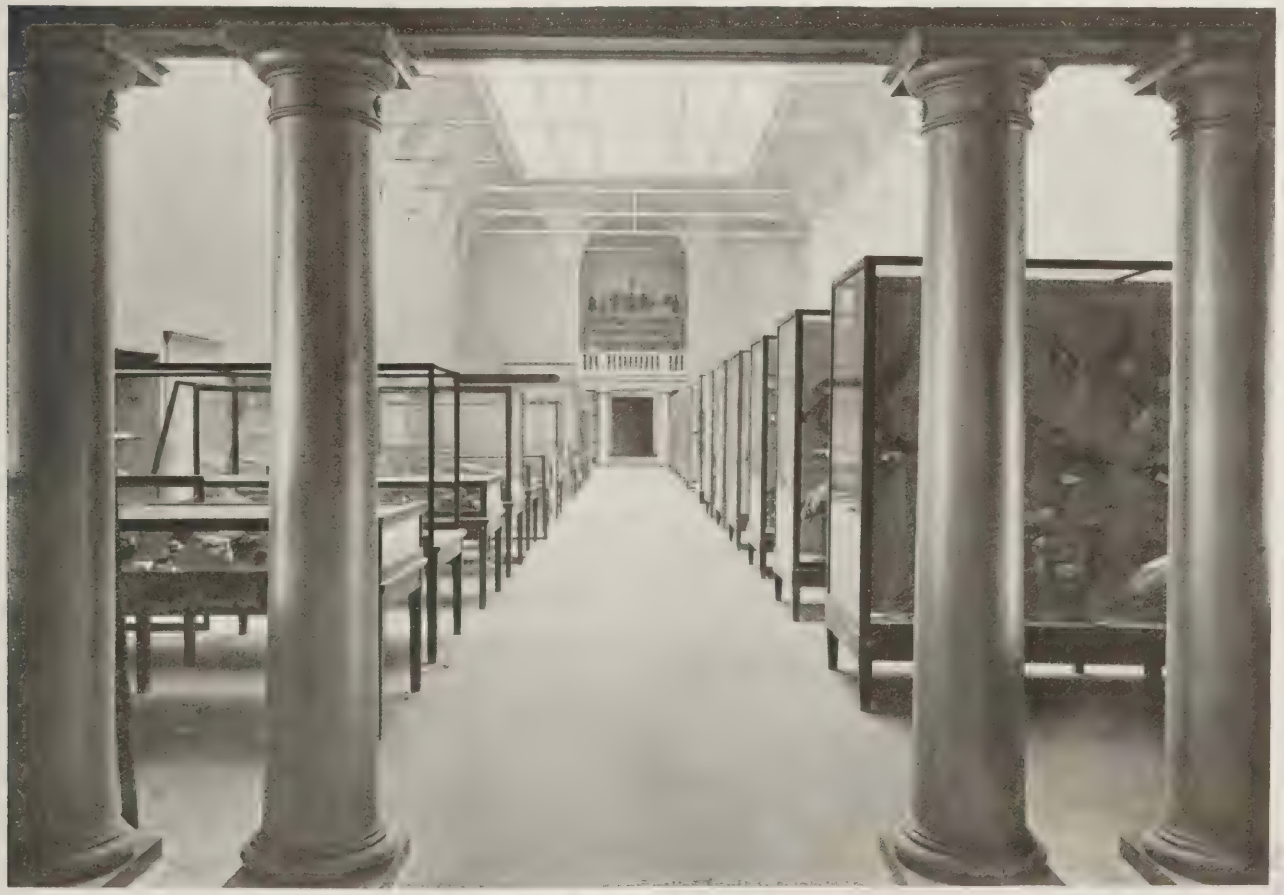
GRAND ARMY ROOM

CENTENNIAL MEMORIAL BUILDING, SPRINGFIELD, ILL.

RICHARD E. SCHMIDT & HUGH M. G. GARDEN, ARCHITECTS; EDGAR MARTIN, SUPERVISING ARCHITECT



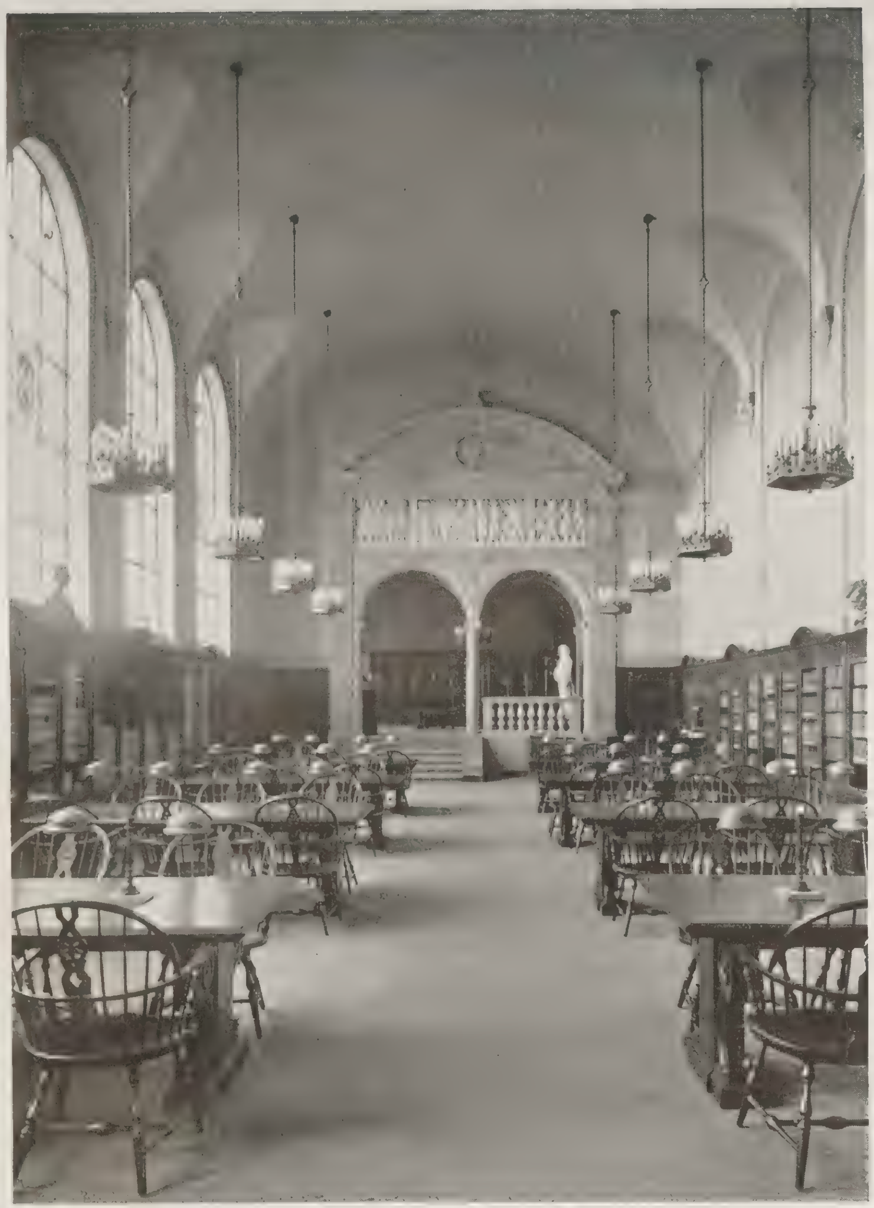
ANTE ROOM, ILLINOIS STATE HISTORICAL LIBRARY



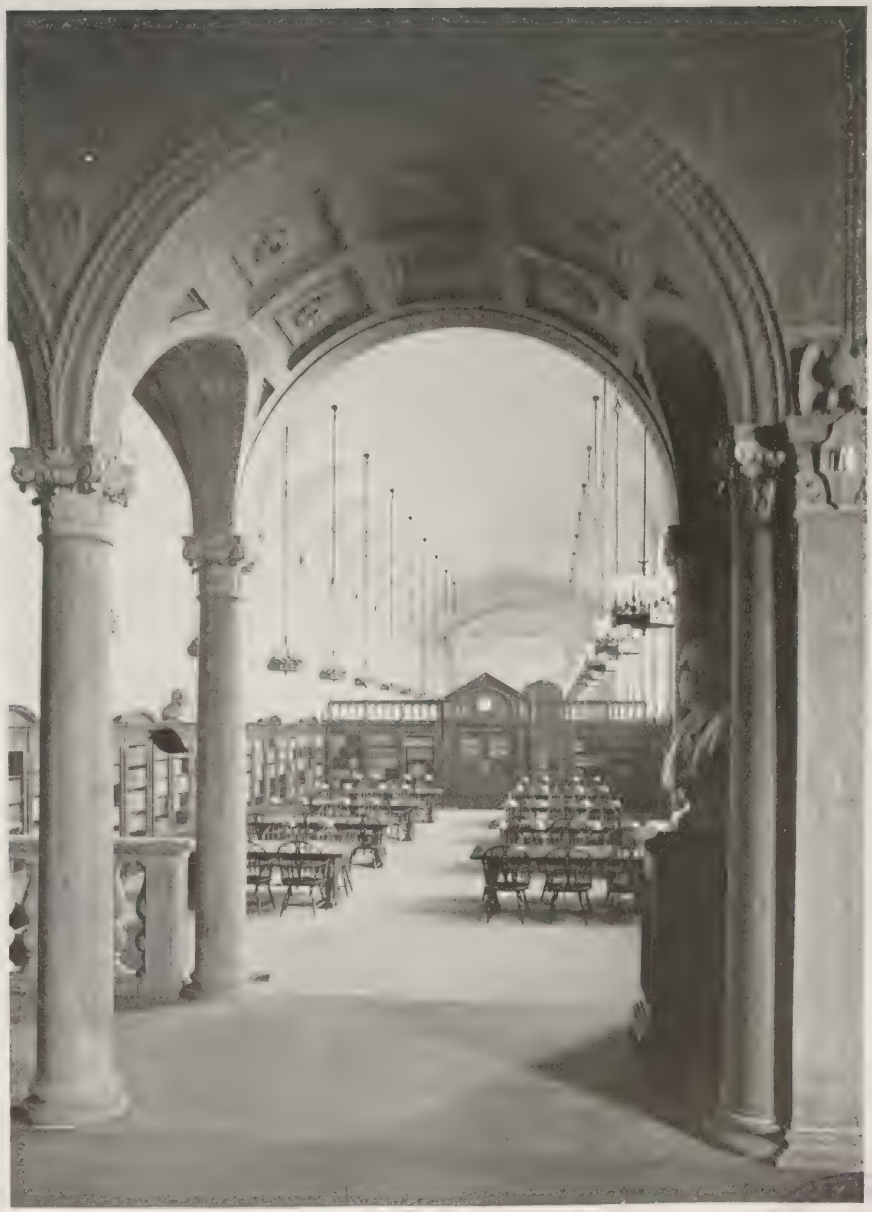
THE MUSEUM AS SEEN FROM ONE END

CENTENNIAL MEMORIAL BUILDING, SPRINGFIELD, ILL.

RICHARD E. SCHMIDT & HUGH M. G. GARDEN, ARCHITECTS; EDGAR MARTIN, SUPERVISING ARCHITECT



ENTRANCE, READING ROOM, HISTORICAL LIBRARY



READING ROOM, HISTORICAL LIBRARY, FROM ENTRANCE

CENTENNIAL MEMORIAL BUILDING, SPRINGFIELD, ILL.

RICHARD E. SCHMIDT & HUGH M. G. GARDEN, ARCHITECTS; EDGAR MARTIN, SUPERVISING ARCHITECT

# BUSINESS & FINANCE

C. Stanley Taylor, *Editor*

# Salesmanship in Architectural Practice

*By* HOWELL TAYLOR

IT is probable that there have been few successful architects who were not also good salesmen. They may never have analyzed the elements of their success, but they have had to be good salesmen because the successful practice of architecture is inseparably linked to an understanding of the principles of salesmanship.

This is an inevitable fact because the architect is constantly exercising creative genius, the results of which must be "sold" to others. That he is asked by his clients to pass judgment on various ideas which they present implies that they have been impressed previously with the value of his creative ability. In spite of the fact that the larger part of the architect's actual practice is judicial and demands the use of specialized knowledge for the solution of others' problems (thus becoming a professional service), his inherent interest lies in the fields of creative effort, and his role is that of originator and salesman of architectural projects.

It is in an architect's province to think in terms of great projects,—of beautiful buildings properly placed, of real estate and park developments which will enhance the beauty and improve the living conditions of cities and suburban communities. It comes as naturally to him as painting does to the painter. It is his mode of expressing himself. He must do it. He thinks in three dimensions, and his colors are bricks, stone and mortar. Perhaps it is his misfortune that the practical elements of carrying out his pictures are so expensive and involve so many more problems than do other arts. Perhaps it is his greatest privilege that this is so, because it makes his art so much more human and involves the activity of so many people who must come under his influence as directing executive. Just as soon, however, as an architect undertakes to paint his pictures—to make them realities—he is compelled to accept the existing methods of architectural "painting" and *all* of the problems these methods involve as well.

Just as a painter must know the technique of mixing paint, the chemical content of various kinds of colors and their action on each other, just so should the architect be willing to study the intricacies of the human relations involved in building; just so must he know the means by whch he can convince others of the value of his projects and keep them working harmoniously to accomplish the end which is sought. It is as much an architect's business to know how to promote and finance a project, and to consider actively the means of doing this, as it is for him to know how to produce an efficient floor plan or to use mosaic tile intelligently. If he has the vision to conceive the project, why should he hand over its execution to others who cannot carry out his ideas as intelligently as he himself could? He should be determined to know as much about the material elements of his practice as the painter knows about his. Is not the promotion of splendid architectural projects—creative salesmanship—a part of using the colors? The architect who conceives a scheme for improving, beautifying or making more efficient some element of city planning or housing should be prepared and should expect to be compelled to "sell" his idea to the people who are the logical customers. If his projects can never get beyond the drawing stage without the assistance of numerous other agencies, he is not an architect but a draftsman.

Take, for instance, the building of Adelphi Terrace in London by the Adam brothers,—a good example of promotional activity by architects of international repute. In this connection it is interesting to note that one of the Adams is thought to have been a banker as well as an architect. The world has profited immeasurably through the creative salesmanship of inventive genius, for every invention has had to be "sold" to someone; in fact the creation of a market for a new article of any kind is confronted with the same problems of selling. What would have happened had Fulton and Livingston waited for some shipping concern to commission them to design a steamship?

### Fundamentals in Salesmanship

"Salesmanship, in its broadest sense, is essentially the selling of one's point of view. . . . When one individual endeavors to influence another to adopt a certain mental attitude or to act in a certain way, he is practicing salesmanship. Everyone can profit by a knowledge of the principles of salesmanship and of successful selling methods, using the terms in this broad sense.

"Everyone, at one time or another, sells his services. If we can present our qualifications in such a way as to convince the other fellow, we shall sell our services more surely, and possibly at a higher

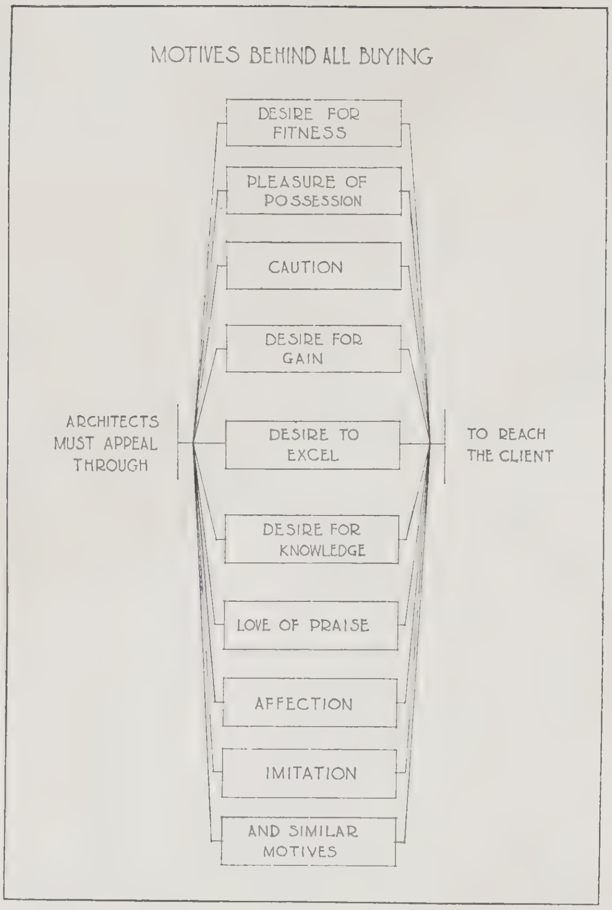


Fig. 1. Motives Involved in Appeal to Client

figure, than if we are uncertain in our methods. The accountant who would become a general auditor would do well to study salesmanship before presenting his proposition. . . . The shop superintendent who desires improved equipment in his plant must 'sell' the board of directors. The corporation treasurer, when he goes to borrow funds, must 'sell' the bank on his proposition. . . . Every man, then, has a vital interest in that knowledge of the human mind and that practice of persuasion in which lies the essence of salesmanship, for it enters into almost all human relations."*

It must be clearly borne in mind, however, that true salesmanship is not coercive or hypnotic. It is merely the logical appeal to the buyer's reason to accept the point of view of the seller.

A study of salesmanship is not only necessary to the architect in selling his own services, but he finds himself contantly confronted with the problem of persuading a client to accept some suggestion in direct opposition to the client's stated desires. The same principles of salesmanship must be used in selling an architectural idea to the client as the salesman in the retail mercantile establishment employs. It is quite possible that these principles must be applied considerably harder in the case of the architect than in that of the retail salesman, and the use of much greater tact and persuasion may be required, for the architect's problem is more difficult.

Too many practitioners in artistic fields have hidden under the guise of temperament their indolence in the practice of business courtesy and their distaste for any failure on the part of clients and others to understand and accept new ideas. This unfortunate point of view (for it cannot be considered an inherent characteristic of the artist) has given members of the artistic professions the reputation of having no appreciation of business economy,—a belief as pernicious as it is fallacious. It is the duty of architects to help correct this false estimate, and a study of salesmanship will help them to do it, because the process of becoming a salesman demands a point of view which permits a complete forgetting of self and lets the architect stand in the shoes of his client. He must ask himself: "Just what am I trying to sell this man? What will it do for him when he gets it? What would I like to have him tell me if I were in his place?" The architect must talk his service, his project, from the "profit-to-you" angle. He must remember that the buyer is only interested in spending money for something which will be of evident benefit. "Behind every human action there is a motive." It is a part of good salesmanship to discover the motives of every buyer and to frame the selling arguments accordingly. If these can be carefully analyzed before a definite appeal is made, the architect will find he can anticipate the client's objections and make successful solicitations. Several of the motives which the architect must recognize are shown in the chart given as Fig. 1. Through them he must influence his client.

"The motive behind every purchase is the satisfaction of one or more instinctive desires. A merchant buys goods for resale to satisfy the money-making instinct; an automobile is bought because it gives pleasure by satisfying the instinctive desire for luxury and comfort, or because it appeals to the pride of possession, or perhaps because both instincts enter into the transaction."* No one can dispute the statement that the failure of many business and professional ventures is due not to lack of merit or ability, but because they are not intelligently presented and therefore lack appeal.

### The "Mental Journey" of the Buyer

The conclusion from the foregoing, namely, that careful analysis of the buyer's thought is necessary for the successful culmination of any sale, suggests that some method must be determined by which the buyer logically may be led, throughout an interview or in a letter, to take the desired action. Long continued practice has shown that there are four distinct stages in a successful solicitation, all of which must be carefully considered and which must become the path of the prospect's "mental journey." These are in the order named, which is the logical order:

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*"Salesmanship and Sales Management," by John G. Jones.

*"Principles of Salesmanship," by Harold Whitehead.

Attention,
Interest and
Desire
leading to
Action.

No matter what medium has been chosen for reaching the prospect, it is essential that certain arguments be specifically prepared to provide for this mental process. Whether the architect is preparing for a personal interview or a mail solicitation, the same condition holds, and a definite arrangement of arguments should be determined before the interview begins or the first letter is written, if the results desired are to be had.

### Approaching the Prospective Client

Two important methods of approach should be studied by the architect: direct personal contact, and carefully written letters. Space is too limited here to consider the details of personal salesmanship, and they must be passed over, merely calling attention to the two texts already quoted. Both contain much practical information of value.

The well studied sales letter is one of the most important elements in the architect's solicitation, and should be given careful attention in presenting any project. It can be made the entering wedge for connections which might otherwise be impossible. It can pave the way for an interview where personal calls would be useless. It can be made a most faithful, business-getting friend, but it must be handled with the utmost tact and the principles of good salesmanship followed faithfully, if results are to be obtained. Every architect who wants to enlarge his practice should study the possibilities and power of letters. They will get to the very sanctums of the great and near-great and, if they are ingenious enough, will bring back the desired message.

Especially to the architect who is doing institutional work of any kind, there is an immense field before him not only for locating prospective clients, but in making intelligent solicitation after they are found. If an architect has two or three buildings of one kind to his credit,—banks, hospitals, hotels or schools, for instance,—he has acquired valuable knowledge which can be capitalized to obtain more commissions of the same kind through carefully prepared letters. An architect who uses letters extensively told me recently that he gets replies from 75 per cent of the prospects to whom he writes, that he is able to keep in touch with the larger portion of his field in this way, and that he gets definite information on many new projects. Fig. 2 makes an interesting generalization.

The structure of the letter which brings results should be given the most careful study, and extreme patience must be exercised in carrying on letter campaigns. One cannot afford to be discouraged if no answers are received after the first or second letter, for it would be like giving up golf after the first nine holes. If letters are not successful, they should be rewritten. Two letters, or three or four, may only succeed in starting a prospect's thought.

The "you" element should be stressed, as in all selling argument. This idea is clearly shown in this excerpt from a volume on business correspondence published by the A. W. Shaw Company: "The old school of correspondents—and there are many graduates still in business—write solely from their own viewpoint. Their letters are focused on 'our goods,' 'our interests' and 'our profits.' The new school of letter writers focus on the viewpoint of the reader, find the subjects in which he is interested, learn the arguments that appeal to him, bear down on the persuasion that will induce him to act at once."

In Fig. 3 a typical case illustrates the application of the necessary sequence of selling arguments intended to get definite information from the prospect regarding the status of a proposed building, and probably an expression of interest in the service. It

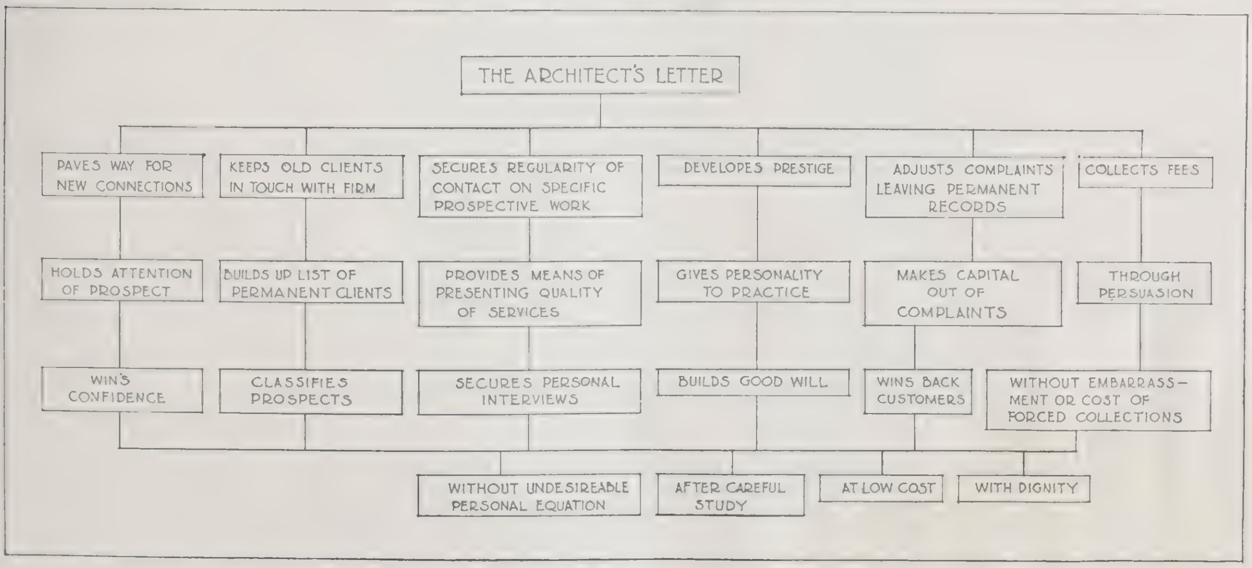
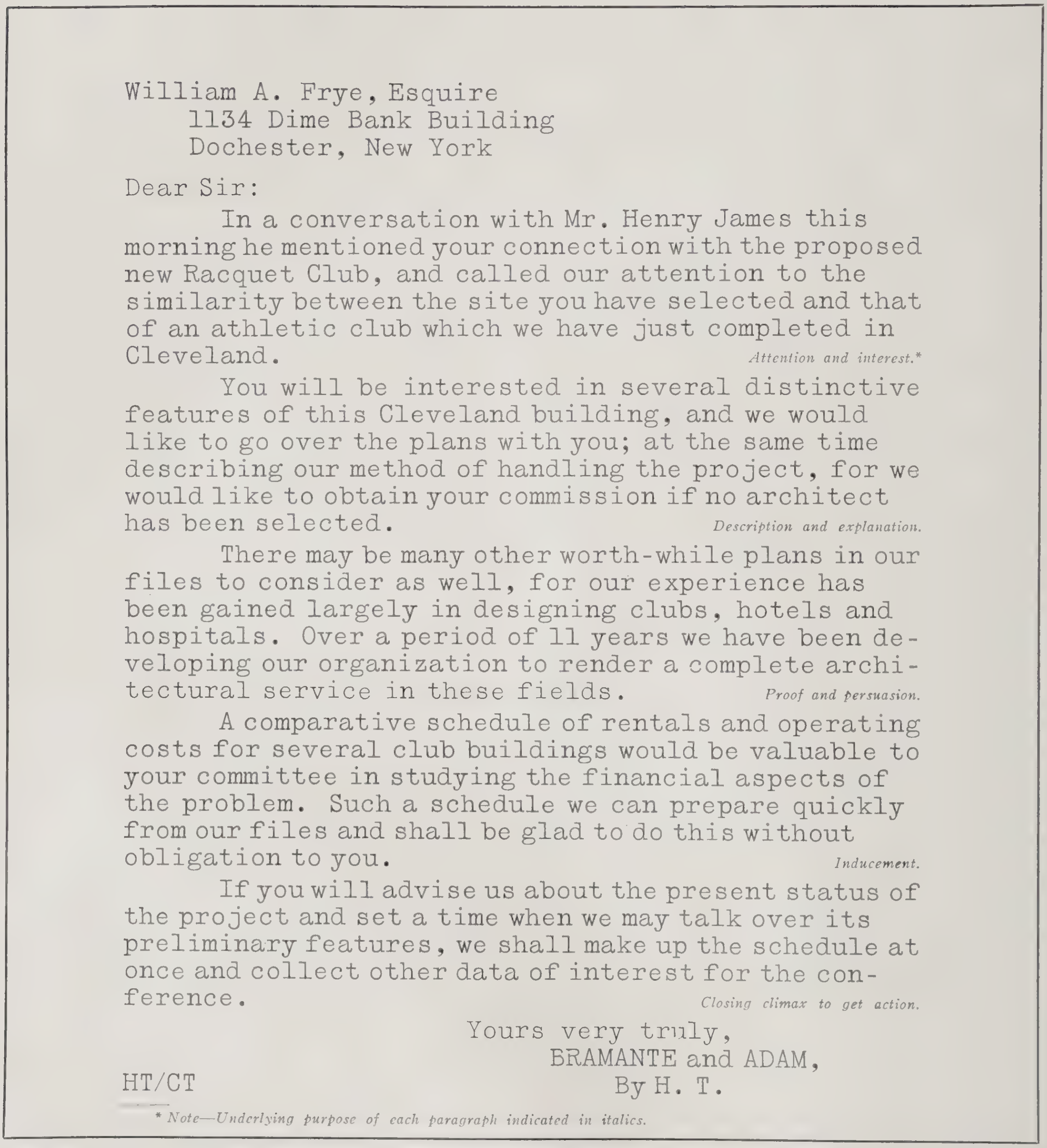

THE ARCHITECT'S LETTER
PAVES WAY FOR NEW CONNECTIONS
KEEPS OLD CLIENTS IN TOUCH WITH FIRM
SECURES REGULARITY OF CONTACT ON SPECIFIC PROSPECTIVE WORK
DEVELOPES PRESTIGE
ADJUSTS COMPLAINTS LEAVING PERMANENT RECORDS
COLLECTS FEES
HOLDS ATTENTION OF PROSPECT
BUILDS UP LIST OF PERMANENT CLIENTS
PROVIDES MEANS OF PRESENTING QUALITY OF SERVICES
GIVES PERSONALITY TO PRACTICE
MAKES CAPITAL OUT OF COMPLAINTS
THROUGH PERSUASION
WINS CONFIDENCE
CLASSIFIES PROSPECTS
SECURES PERSONAL INTERVIEWS
BUILDS GOOD WILL
WINS BACK CUSTOMERS
WITHOUT EMBARRASS-MENT OR COST OF FORCED COLLECTIONS
WITHOUT UNDESIREABLE PERSONAL EQUATION
AFTER CAREFUL STUDY
AT LOW COST
WITH DIGNITY

Fig. 2. Diagram Showing Service Rendered by an Architect's Letter



William A. Frye, Esquire
1134 Dime Bank Building
Dochester, New York

Dear Sir:

In a conversation with Mr. Henry James this morning he mentioned your connection with the proposed new Racquet Club, and called our attention to the similarity between the site you have selected and that of an athletic club which we have just completed in Cleveland. *Attention and interest.**

You will be interested in several distinctive features of this Cleveland building, and we would like to go over the plans with you; at the same time describing our method of handling the project, for we would like to obtain your commission if no architect has been selected. *Description and explanation.*

There may be many other worth-while plans in our files to consider as well, for our experience has been gained largely in designing clubs, hotels and hospitals. Over a period of 11 years we have been developing our organization to render a complete architectural service in these fields. *Proof and persuasion.*

A comparative schedule of rentals and operating costs for several club buildings would be valuable to your committee in studying the financial aspects of the problem. Such a schedule we can prepare quickly from our files and shall be glad to do this without obligation to you. *Inducement.*

If you will advise us about the present status of the project and set a time when we may talk over its preliminary features, we shall make up the schedule at once and collect other data of interest for the conference. *Closing climax to get action.*

Yours very truly,
BRAMANTE and ADAM,
By H. T.

HT/CT

* *Note—Underlying purpose of each paragraph indicated in italics.*

Fig. 3. Suggested Draft of Architects' Letter to Prospective Client

is well to note the slight variation in the mental stages from that just mentioned. For sales letters they are:

Attention and Interest:
Description and Explanation;
Proof;
Persuasion;
Inducement;
Closing Climax to get Action.

This discussion cannot in any way be considered more than the briefest statement of sales principles suitable for the architect's use. It is by no means a finished group of ideas obtained through long practical experience. Rather is it a rough analysis of wide fields toward which the coöperative research of an active and thoughtful profession should be energetically directed. The salesman of today creates business for his product. If he waited for a buyer to sense a need, seek out or invent the article he wanted, there would be few great manufactures. Most of the work done would be specialized hand labor. It took much creative salesmanship to bring the world to the point of commercial expansion that has been attained today. The study of salesmanship by architects can make the profession a more effective element in daily life, to the profession's benefit.

# Farmhouses Near the Riviera

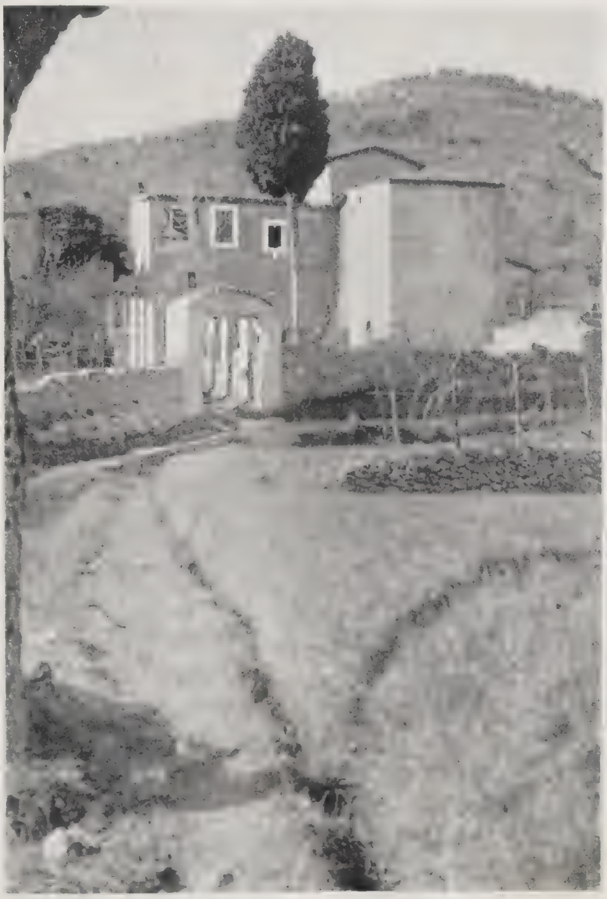
*By* WILLIAM D. FOSTER

THAT part of the Riviera from Cannes to Menton is probably as well known to English and American tourists as any one section of the world. And well it may be, for anyone wishing to escape from the cold and snow of our northern states or from the drizzly dreariness of an English winter has only to go to the coast of southeastern France to bask in the sunshine of a climate where rain is little known and where only the nights are really cold. This tourist-Riviera stretches itself along the coast like an indolent person lying on a beach, safe in the assurance that it is protected from the cold winds of the north by the mountains. These Maritime Alps come down to the coast in great barren ridges, but as they lower themselves the cold gray of their stony peaks is graded off by terraced olive groves into the fine, fertile fields which they enfold, and where one finds farmlands and orchards basking in the Mediterranean sun.

However, most of the peasants in this section remain grouped in towns and villages, as they have for so many years, and go out from there to their little patches of land which they cultivate so intensely. Here in these little gardens they may erect small houses for their tools, for drying their fruit or storing their vegetables and for protection for themselves against the weather, but at dusk they return to their homes in the towns.

This living in towns is a quite natural consequence of the history of the region, where for centuries it was necessary for people to protect themselves against attacks and to repel invasions. It is a country which has been the fighting ground of warring factions of Europe from time immemorial. After the fighting which we may presume took place between the cave men and the various savage tribes, history tells us of the invading Romans who conquered southern Gaul; of the Saracens who drove out the Romans; of the wars between the Lombards and the Saracens, and further of the struggles between the Guelphs and the Ghibellines, when counts of France and counts of Italy alternately held this or that town, until finally in 1859 Italy ceded to Napoleon III Savoy and the towns along the Riviera, except for Monaco, which had already placed herself under a French protectorate. So it was that, until comparatively recently, it was necessary in this territory for the people to live in towns, going out during the day to their farmlands. Today they still hold to their communities in great part, and the big farmhouse or farm group is not often found. Old customs are clung to tenaciously.

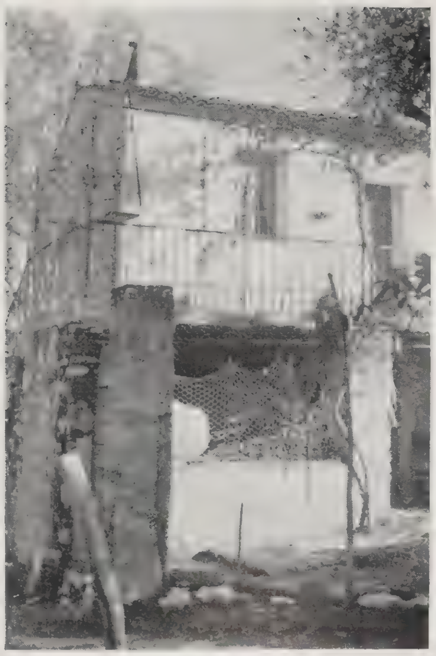
Those that we do find are quite Italian in character, and for various reasons. Most of them were built while the country was still under the control of Italian lords; but even if built today they would be under the same influence, for the population is almost as Italian as it is French, more mixed probably than it is at most borders, although it is never possible to see any quick or absolute change in character and custom at frontiers, for peoples mix in spite of governments. This mingling of nationalities as shown in the architecture is similar to the *patois* which is spoken here, a dialect which one writer has described as "French rubbed with garlic." In the case of the architecture, I feel that it is more nearly Italian, touched slightly with perfume.

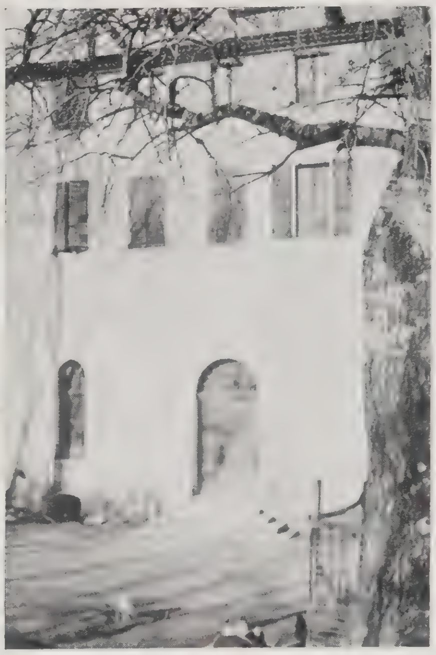


A Small Italian Farmhouse Near Sospel

Climatic conditions are also a determining factor in architectural development, and climate like customs has little regard for the imaginary lines indicated on maps by victorious kings or by peace conferences. So here we have the same flat-sloped roof of red or yellow tiles, the same stucco wall surfaces, and the rather small window openings as in Italy.

While the hills around here are filled with stone, it doesn't seem to


Old House in Olive Grove
Not far from Peille

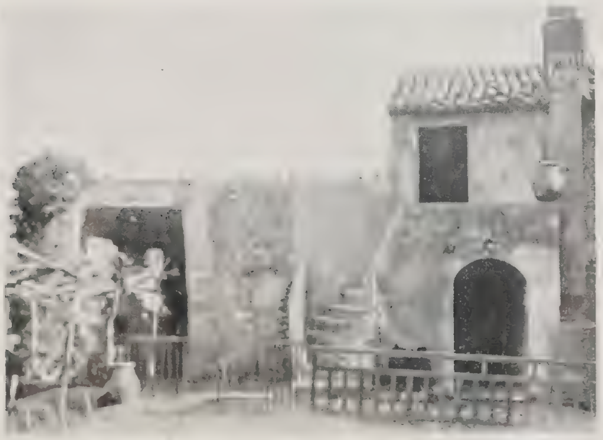

"House with Olive Oil Mill"
Near Villeneuve-Loubet

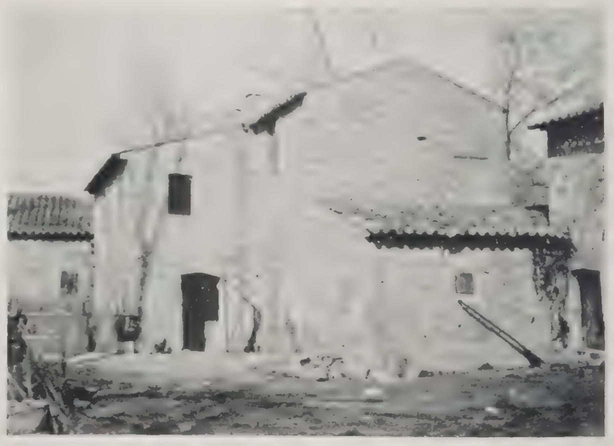
be a stone that is very good for quarrying, so that we find very little cut stone used in the buildings. The walls are generally laid up in a pretty rough fashion with the rounded rocks set in the mortar and with pieces of old tiles and bricks filling in the spaces; a great deal of mortar is generally used, so that the result somewhat resembles a concrete mixture. These walls are then stuccoed or, as in some cases, left with only a little pointing up so that the stones and bricks show in spots. In a few cases where the stone surfaces have been left uncovered the stones seem to have been laid with greater care on the outside, but seldom has the stone been cut or trimmed. Practically always where a vault occurs or where an arch has been used, the form has been made with bricks instead of with stones.

Mounting up between two high ridges back of Monte Carlo is a valley which is cut at right angles by another ridge so that this north and south valley is divided into an upper and lower *terrain*. The lower is rather barren, but the upper is very fertile, and there lies the town of Sospel, a small town with a long history; around it is farmland and a number of farmhouses. All of those shown here are within a comparatively short distance from Sospel and are quite typical of this whole valley. They are all covered with light, almost white, stucco except for one where the gray stone shows through what probably was once a complete coat of plaster. The roofs are covered with simple round tiles, once light red, but now covered with moss so that they are brown and pale green in spots, everything toned with the beauty of age.

A small house at the entrance to the "Golf Hotel"—so-called because it has a golf course which is one of the two that can be reached easily from Monte Carlo—is now used for service at one end and as a barn at the other. So far as one can tell it might be a small house set in the foothills of California.

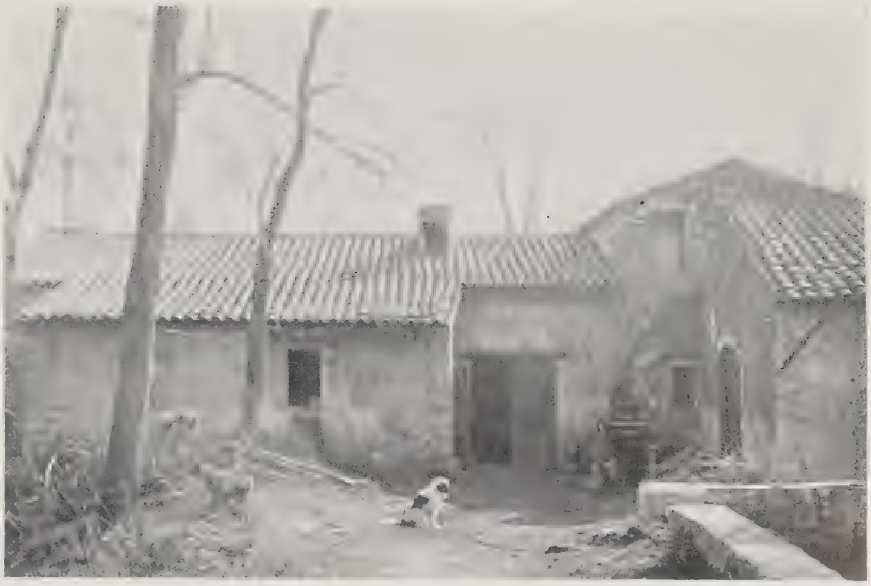
In this same general district, but farther up on the hills near the town of Peille and in middle of a terraced olive grove, is the little house with a balcony at the second floor level. It is only a very simple peasant's home, but it is interesting as well for being near Peille, a small town where Americans will be likely to find themselves exceptionally well treated. And when they wonder just why, they will find the probable answer on a tablet which marks a certain rather small, rough road as the "Avenue Mary Garden." It seems that this honorary citizeness of Peille had visited the town on


"Le Columbier" at Cagnes


Old Mill at Cagnes-sur-Mer

several occasions and had found it so interesting that she contributed a considerable sum towards the erection of a war memorial.

Quite to the west of this district and between Nice and Cannes is the town of Villeneuve-Loubet, a mediæval stronghold which was the scene of various historical events and for years the residence of the powerful Villeneuves who ruled over this and many of the neighboring towns. This district also is quite rich in both farmlands and forests.

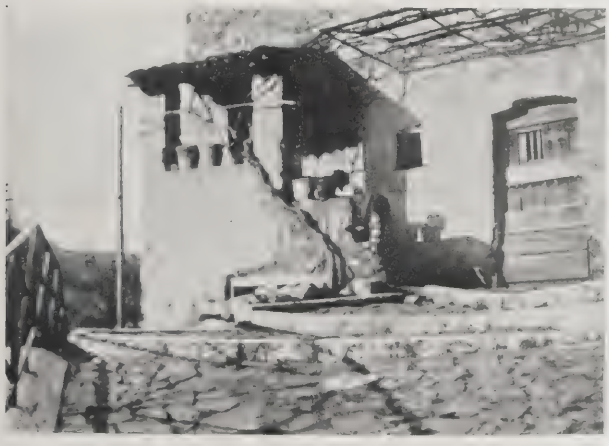


Low, Spreading Buildings of Stucco, with Tile Roofs
Another view of mill at Cagnes-sur-Mer

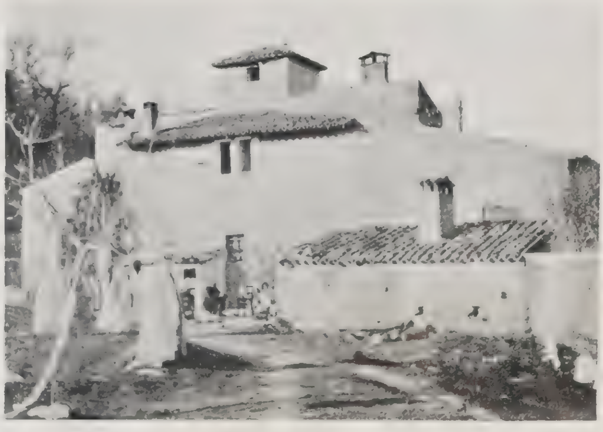
It is near the town that we find the rather dignified facade of the house which is part of the old olive oil mill, a mill that is running today for the same purpose it has run for so many years. Not much farther along the same road is a fine old farm building which one day must have been a real country seat, judging from its size and from the walled entrance courtyard which doesn't show in the photograph and which is now in decay and very dull. The arrangement of the roof on this building is particularly interesting. Another house which was probably once the residence of a great landowner is a long rambling affair now serving both as a "residence" for several families and as a sawmill, the water power running in a stream through an archway under the house.

Also near Villeneuve-Loubet, but quite away from anything but a little used carriage road, is an abandoned farmhouse with its loggia on the upper floor. It is a question whether this open loggia was for the comfort of those who once lived in the house or whether it wasn't primarily used for drying fruit, as is the case today in so many country buildings where such loggias are used to catch the southern sun on the figs and orange peels and to protect them from any rain. At any rate, it is an interesting motif which would make an admirable porch. The entrance gateway to its old courtyard is typical of the district, emphasized by being raised a little higher than the surrounding wall and covered with a little patch of tiling. The buildings on the other side of the court are quite uninteresting and quite changed from their original plan. The little covered porch, with its curious worn steps leading up from the street, is on the very edge of the town and peers over onto the newer highways so that its owners can sit and watch the trams and *char-a-bancs* as they pass on toward Grasse, carrying their sightseers to the perfume factories.

Another amusing entrance porch is that on the little house at Cagnes called *Le Columbier*. The house only a few months ago was a ruined barn, but an enterprising and clever Frenchwoman, impressed with the steadily increasing number of American and English visitors coming to her town,



Doorway at Villeneuve-Loubet



A Relic of Better Days

bought it, remodeled it in a simple way without losing any of the character of the old places of the district, and rented it before it was finished! The anomaly of a modern electric light over the archway and the use of a defunct iron bed for a portion of the fence are not very successful, but they are characteristic of the country round about.

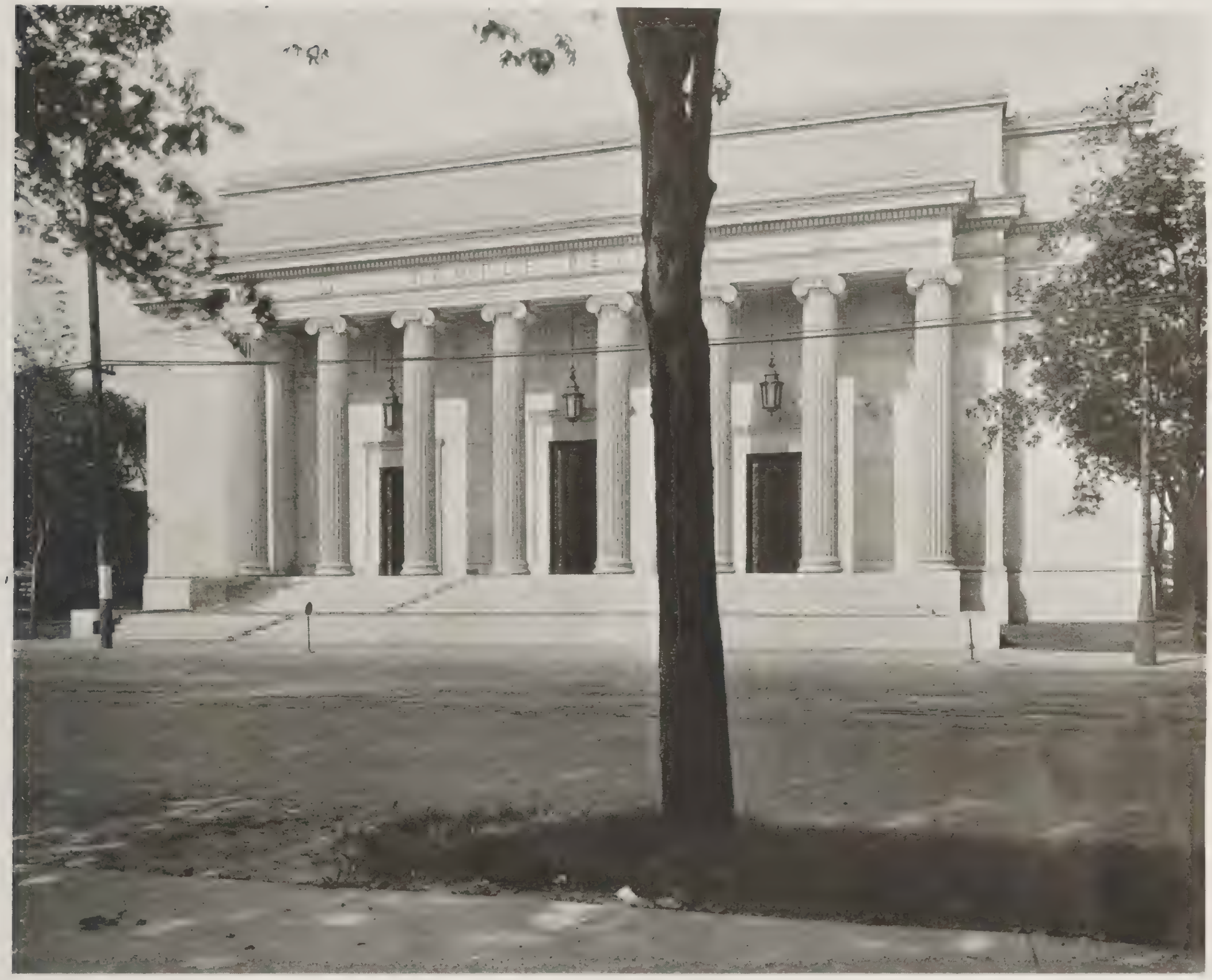
The other house at Cagnes is in the lower part of the town, near the tramway, and where it is gradually being surrounded by the newer business buildings. It too was once an old olive oil mill, and the new owner of the buildings offered to sell me the old wooden presses, long ago supplanted by more modern affairs, with the comment that I could probably sell them to some museum as authentic mediæval instruments of torture. I did not buy them, however, as they seemed rather bulky.

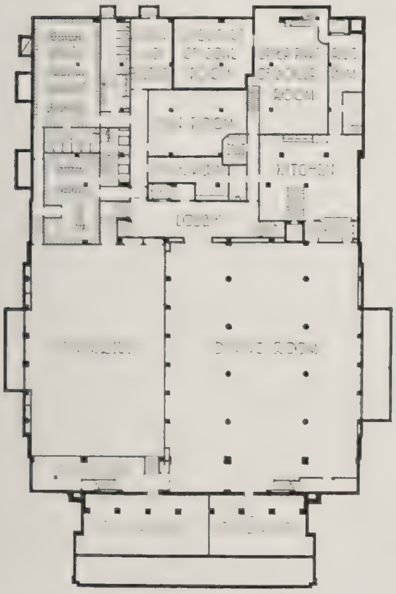
There is very little real elegance to be found in these buildings back of the Riviera, for this is truly peasants' country. Also, when a Frenchman decides today that he wants to live in the country, he seldom is satisfied to take an old place and restore it properly; he prefers to build himself a real "villa," always a terrible affair and quite modern indeed. So, even when one does find a fine building such as the farmhouse near Villeneuve-Loubet, its former elegance is largely lost in the squalid conditions existing under the present peasant rule.

Old farmhouses near the line which divides Italy from France are likely to contain many a treasure, particularly where, as often happens, the house has been the home of several generations of the same family. Particularly interesting is the furniture with which these old houses are sometimes filled, showing as it does influences both French and Italian and often quite defying classification. Interesting, too, are the peasant versions of ironwork, pottery, lace, embroidery and all the other forms of handicraft in which the workers made use of motifs inherited from family tradition quite as often as those in fashion at the time.

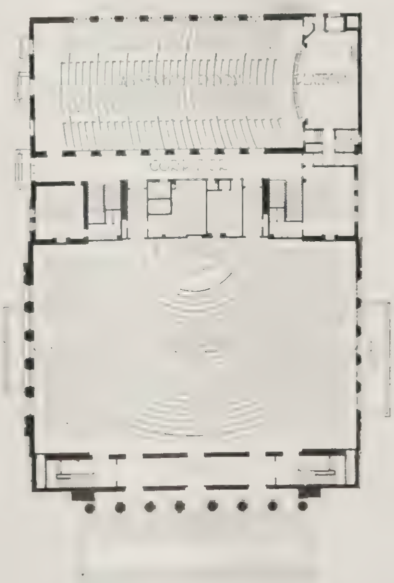
Dominican Brothers' Home
Near Sospel

An Old Farmhouse with Its Barnyard

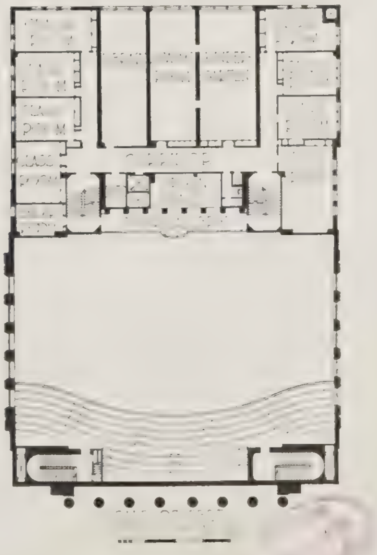




BASEMENT PLAN



FIRST FLOOR PLAN

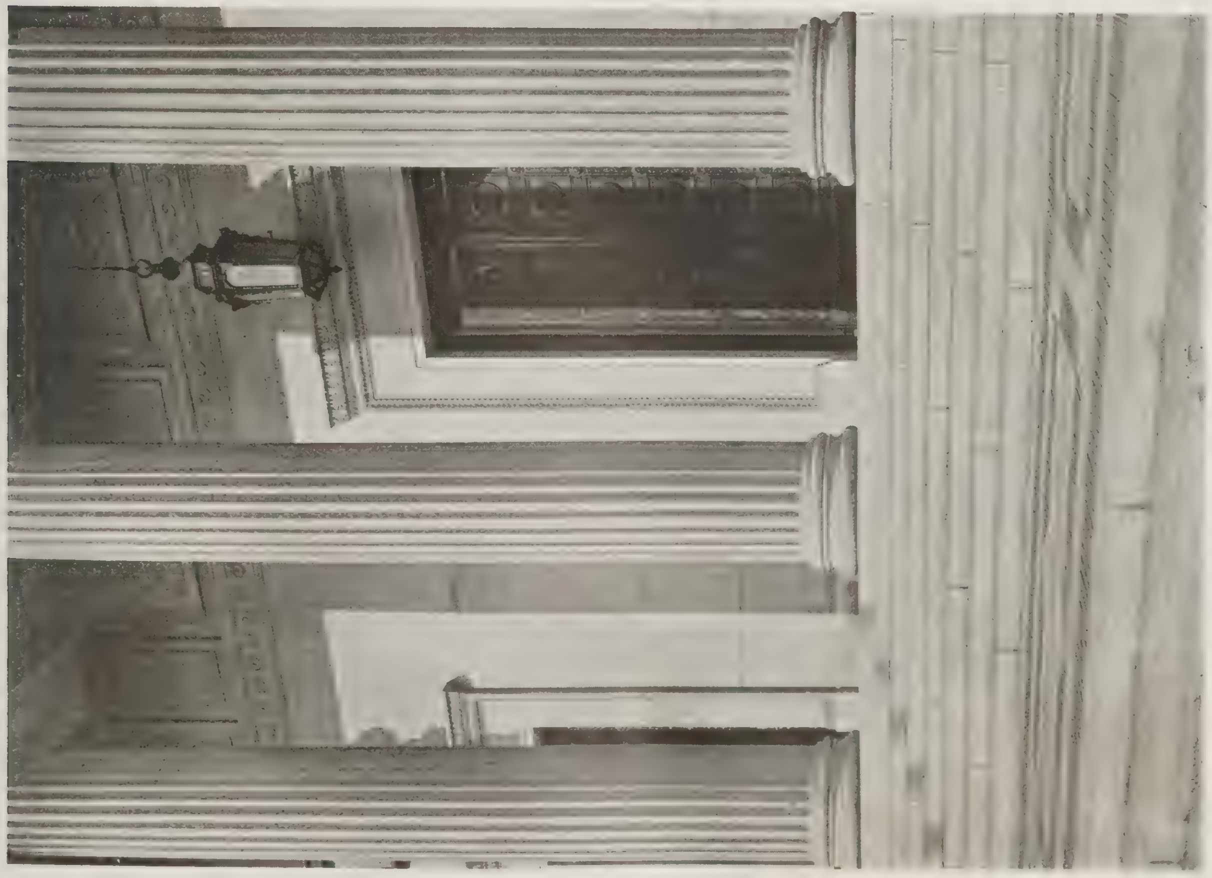


SECOND FLOOR PLAN

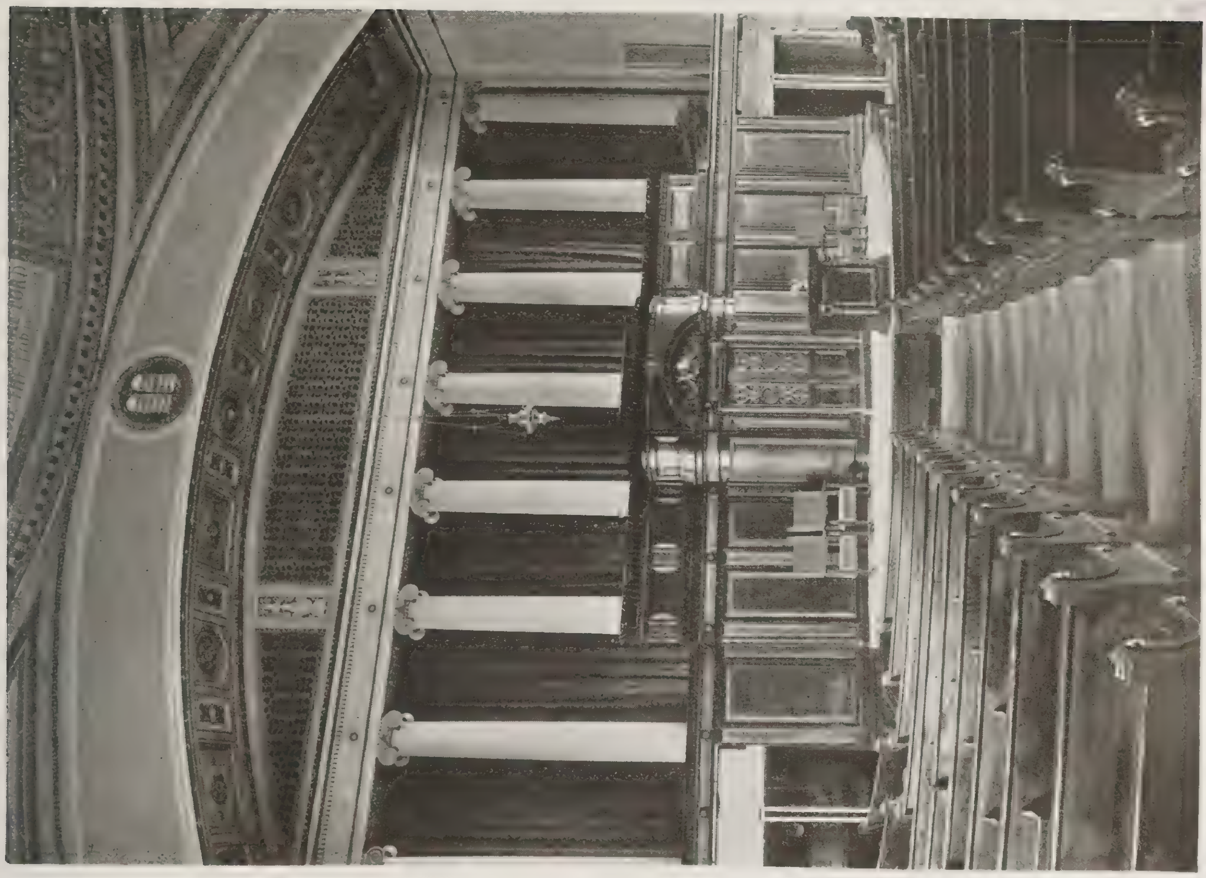
TEMPLE BETH-EL, DETROIT

ALBERT KAHN, ARCHITECT

*Photos, John Wallace Gillies*

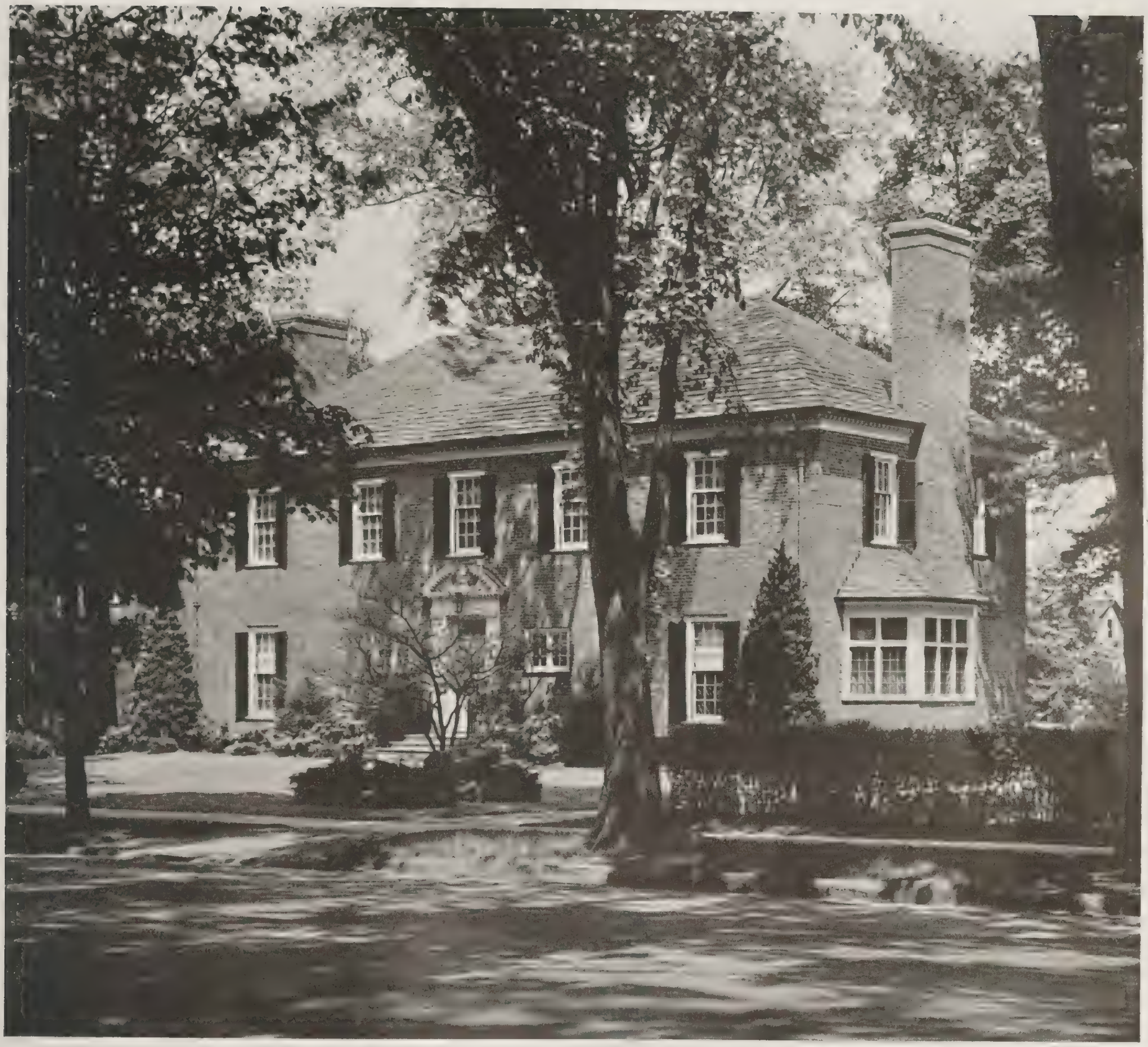


DETAIL OF MAIN ENTRANCE

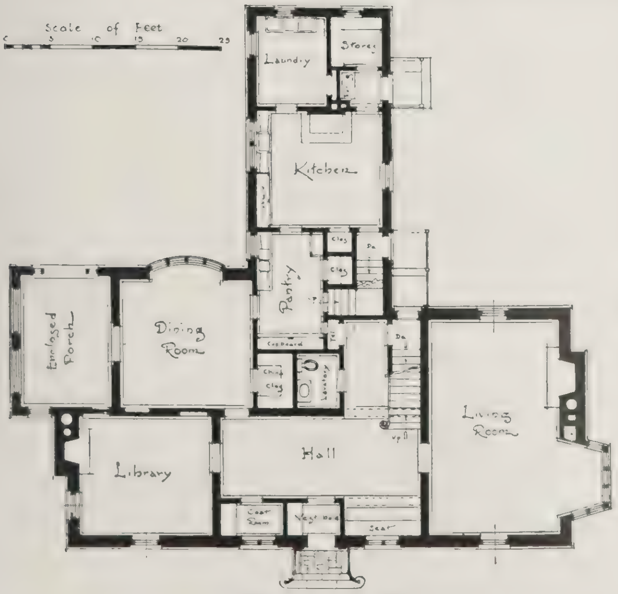


INTERIOR LOOKING TOWARD PLATFORM

TEMPLE BETH-EL, DETROIT
ALBERT KAHN, ARCHITECT



GENERAL VIEW OF HOUSE FROM STREET



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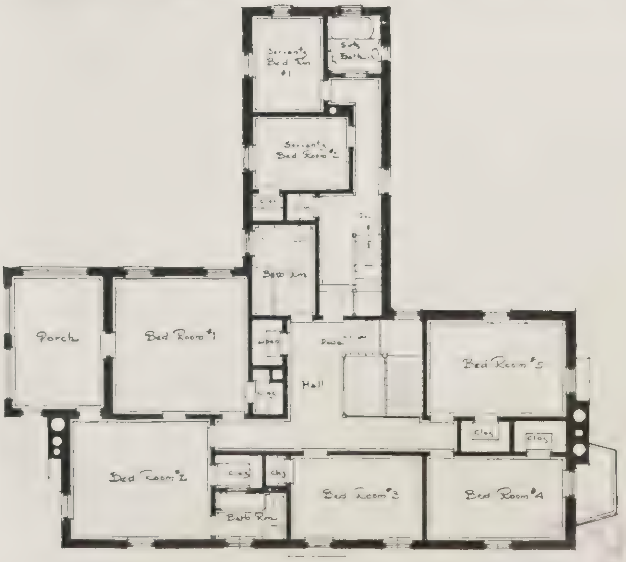
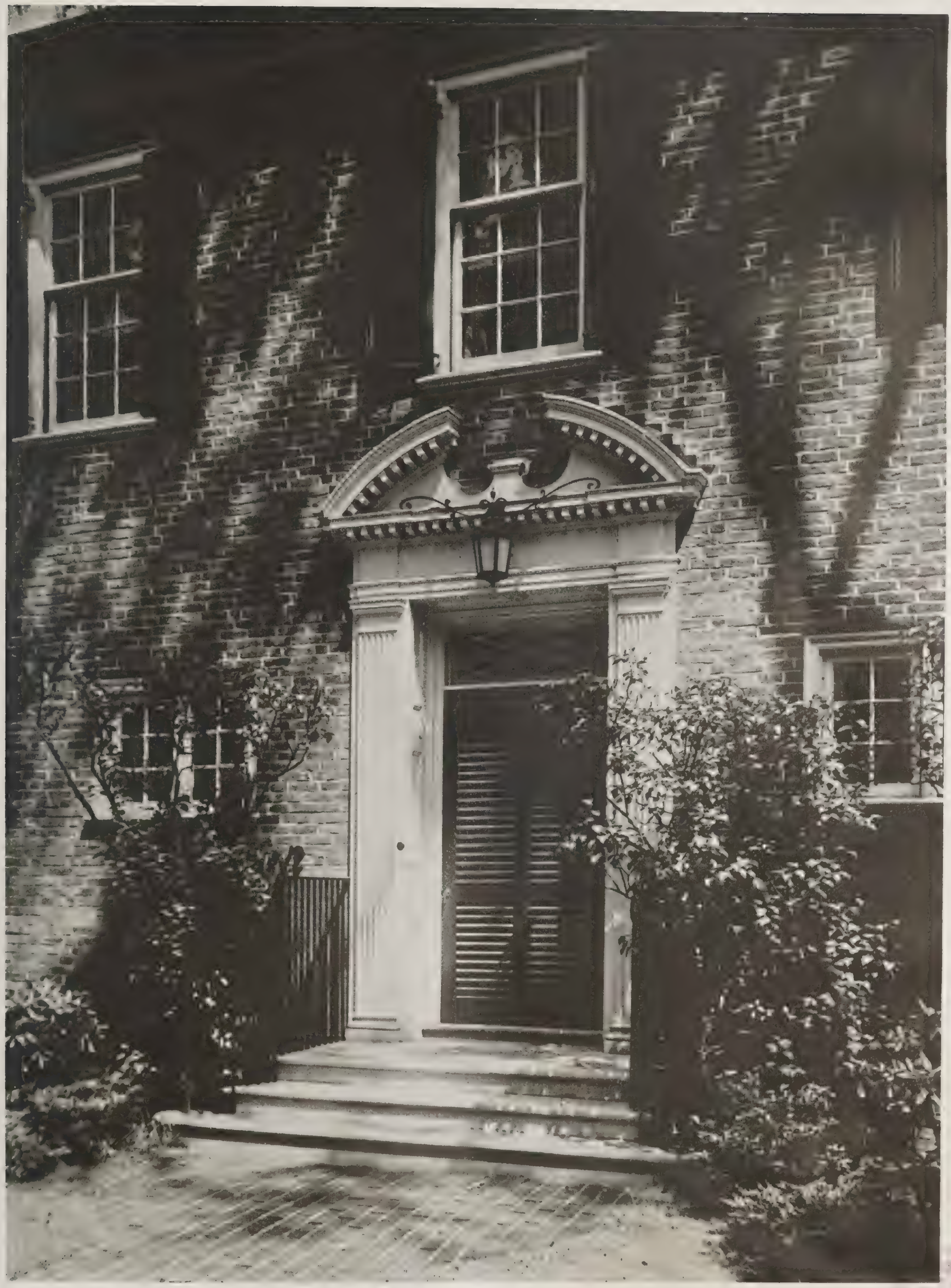
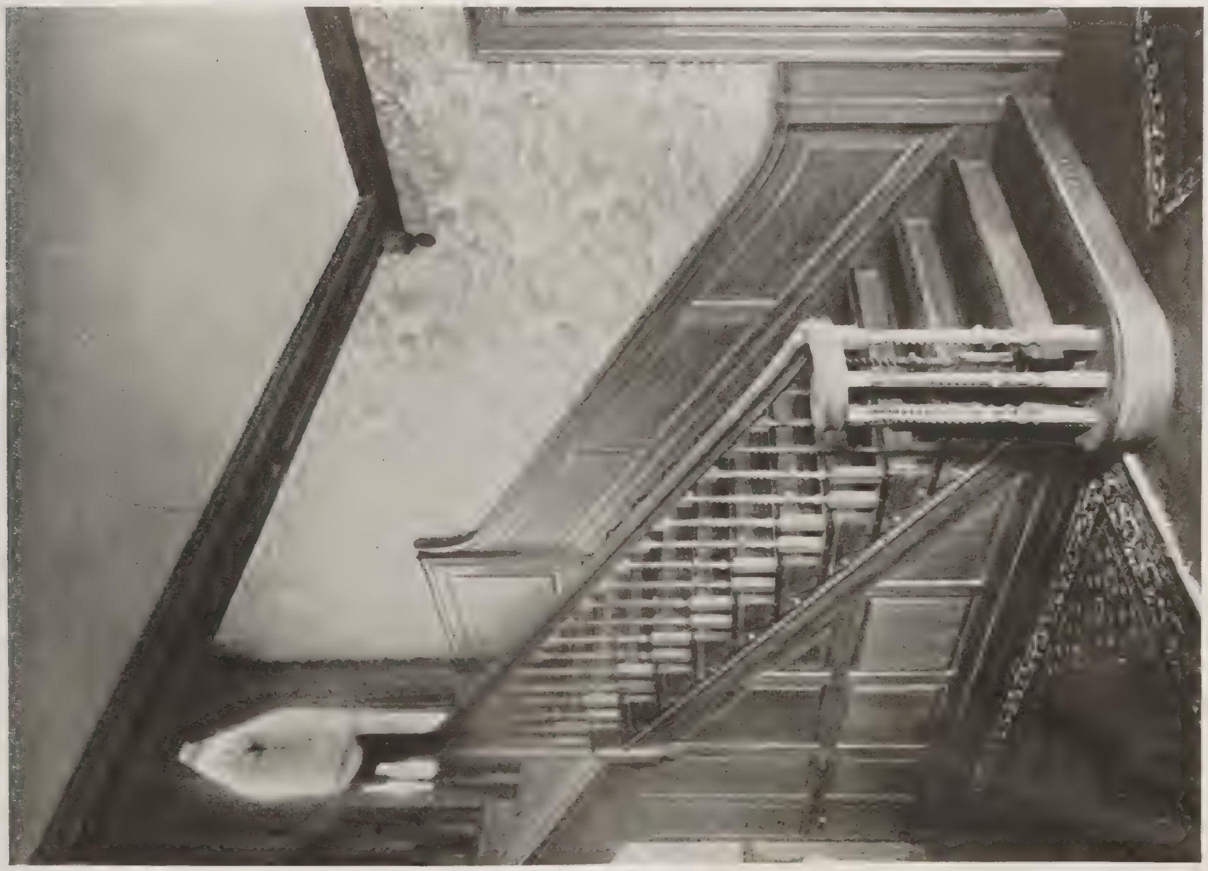


SECOND FLOOR PLAN

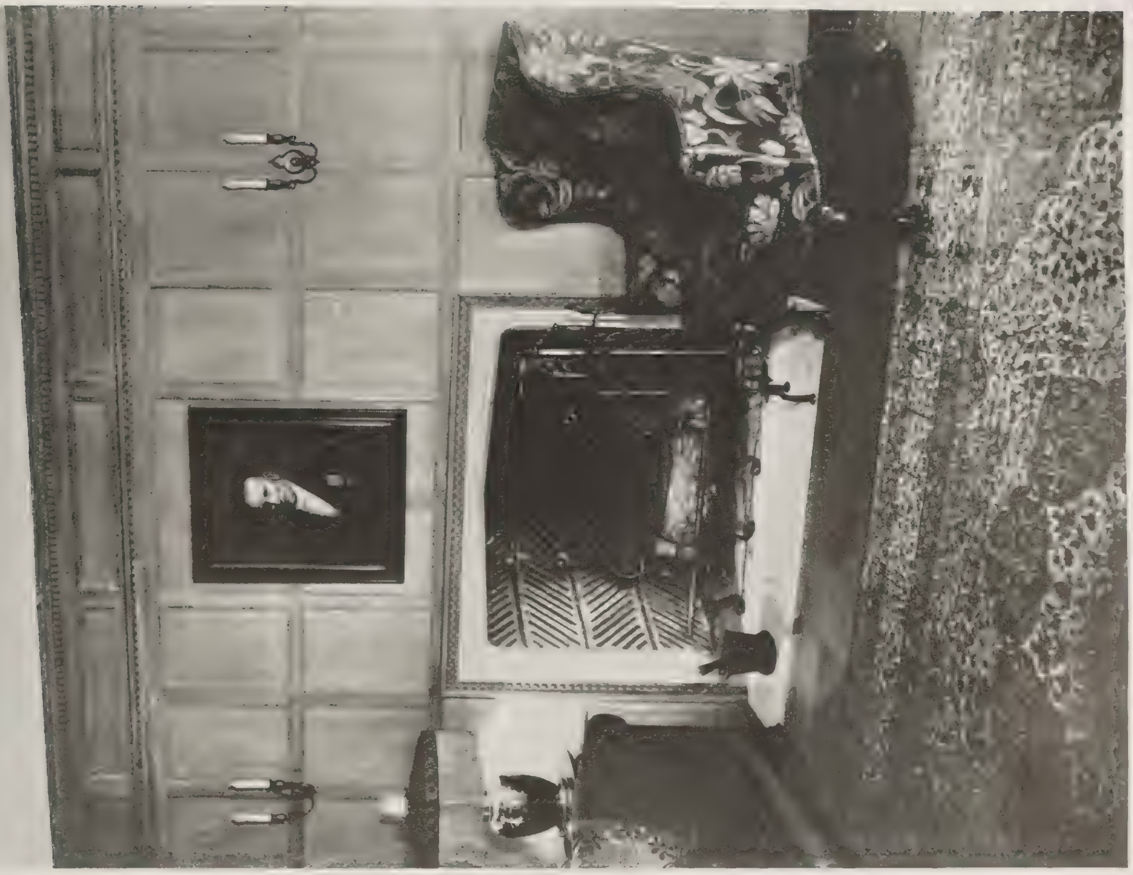
HOUSE OF WILLIAM J. HAMILTON, ESQ., FLUSHING, N. Y.
ROGER H. BULLARD, ARCHITECT



VIEW OF MAIN ENTRANCE DOORWAY
HOUSE OF WILLIAM J. HAMILTON, ESQ., FLUSHING, N. Y.
ROGER H. BULLARD, ARCHITECT

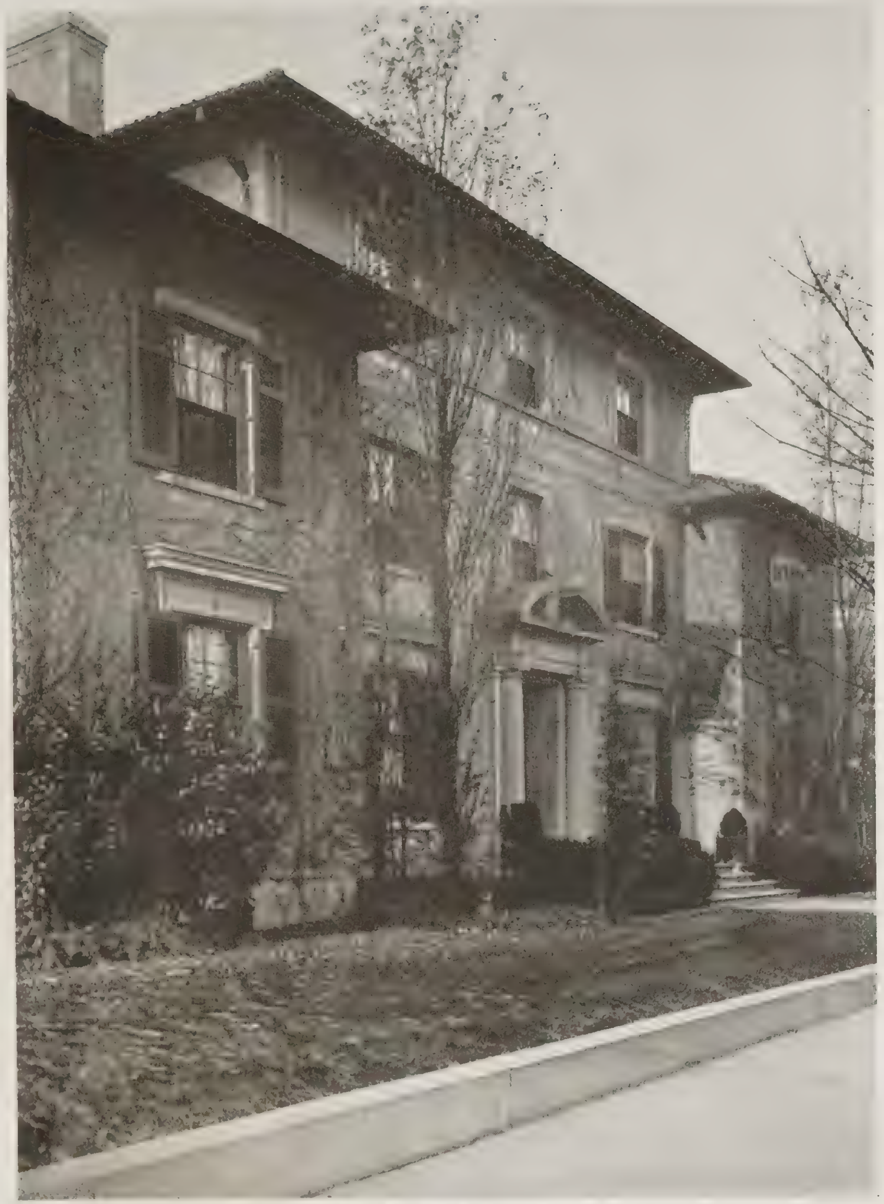


VIEW OF MAIN STAIRWAY

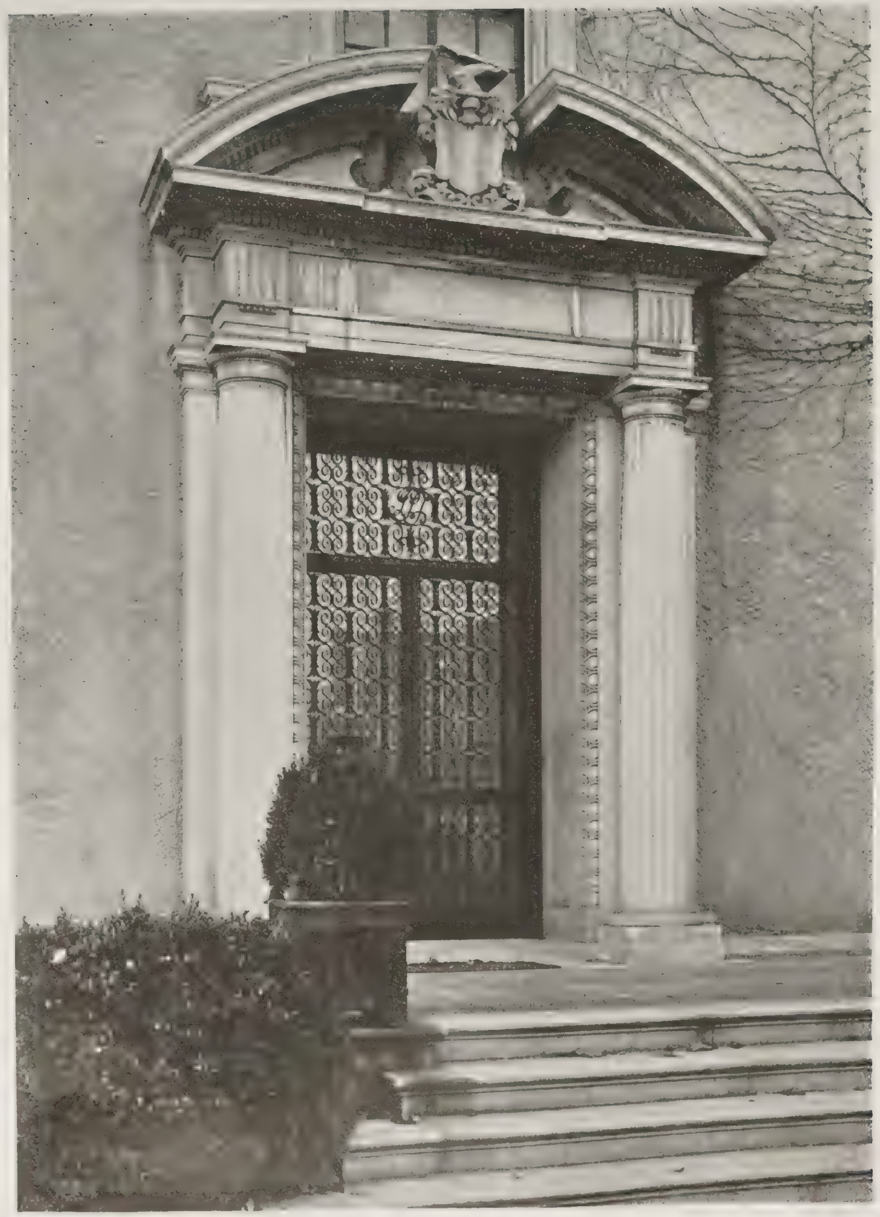


LIVING ROOM FIREPLACE

HOUSE OF WILLIAM J. HAMILTON, ESQ., FLUSHING, N. Y.
ROGER H. BULLARD, ARCHITECT

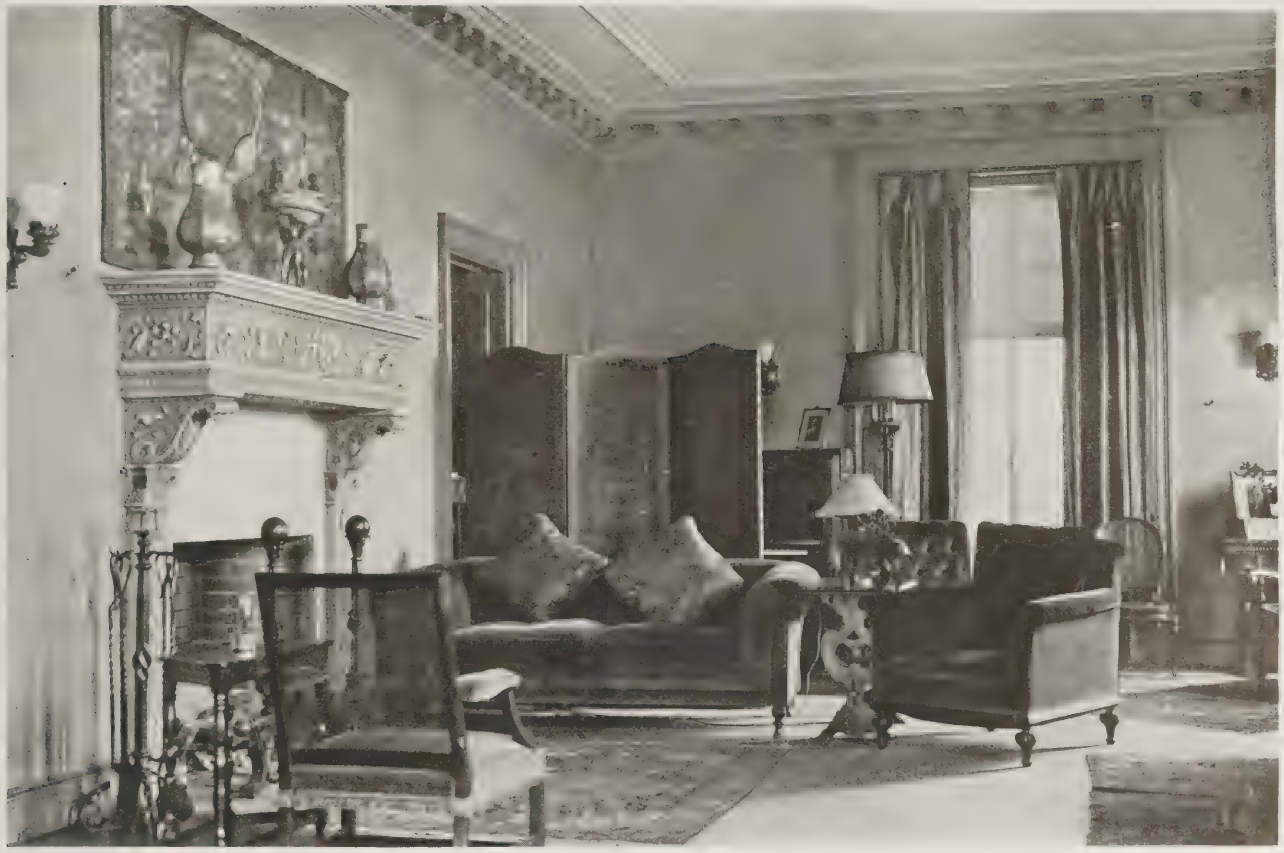


VIEW OF STREET FACADE

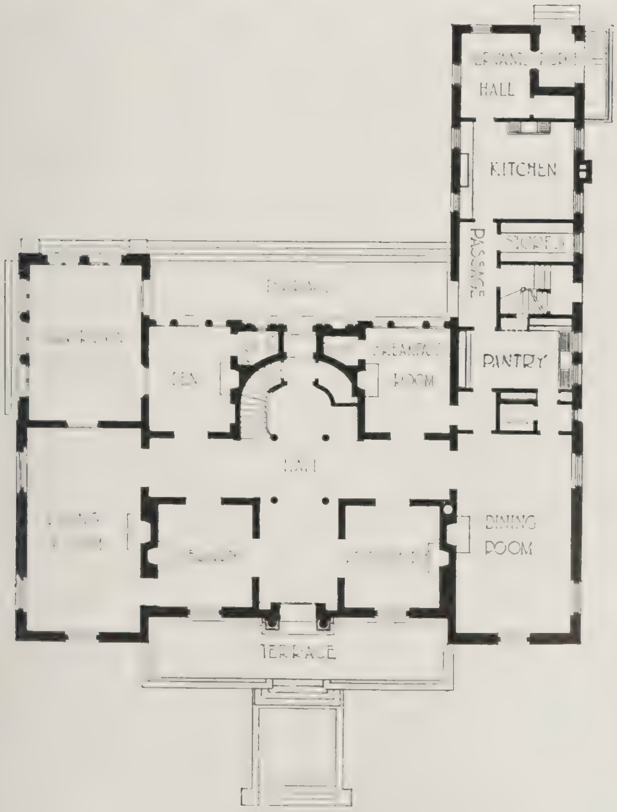


DETAIL OF MAIN ENTRANCE

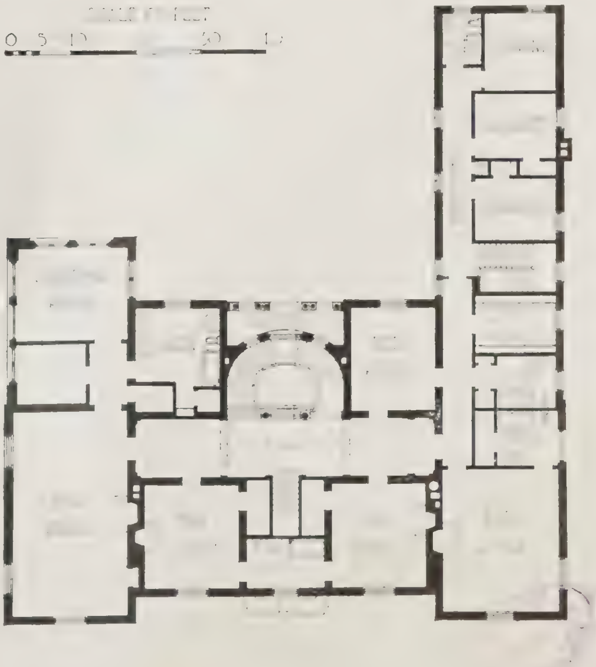
HOUSE OF J. P. TAYLOR, ESQ., RICHMOND, VA.
W. DUNCAN LEE, ARCHITECT



VIEW IN LIVING ROOM



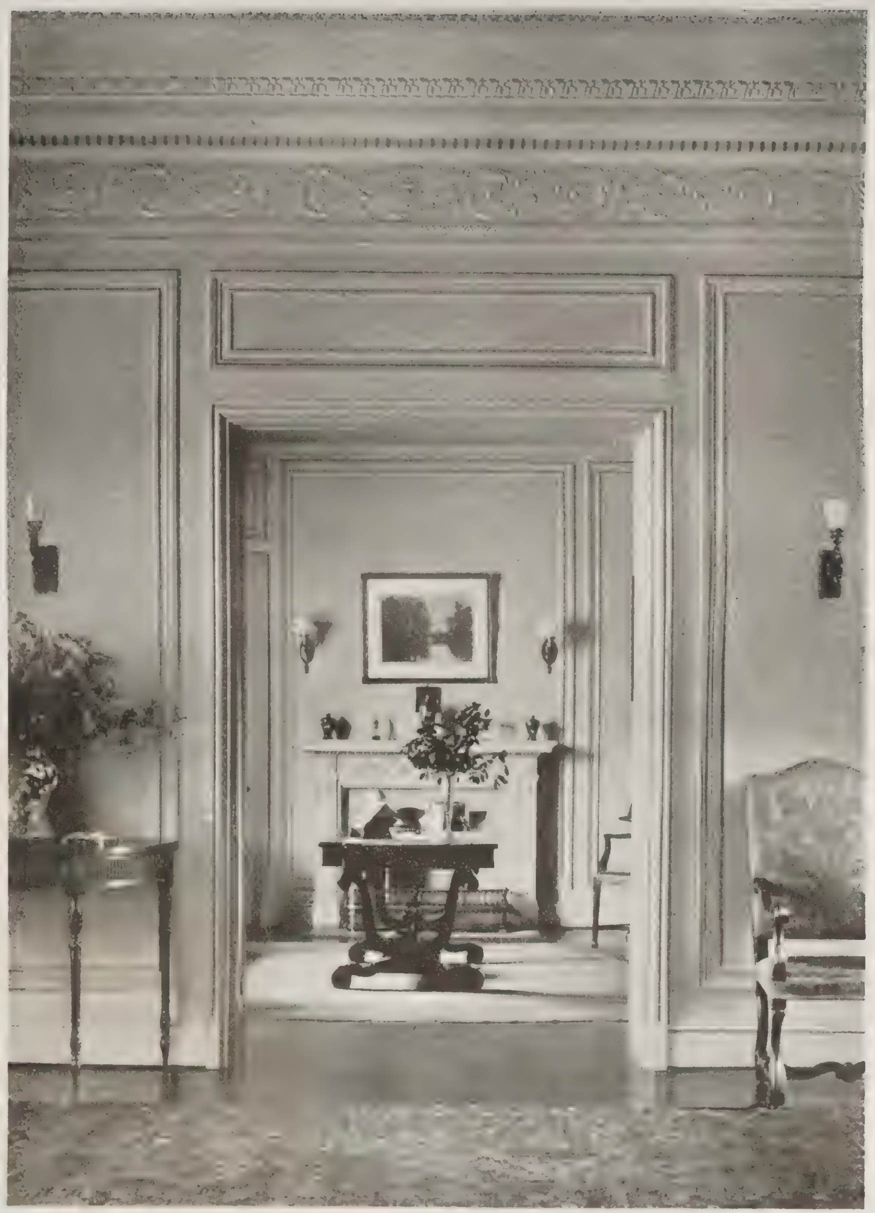
FIRST FLOOR PLAN

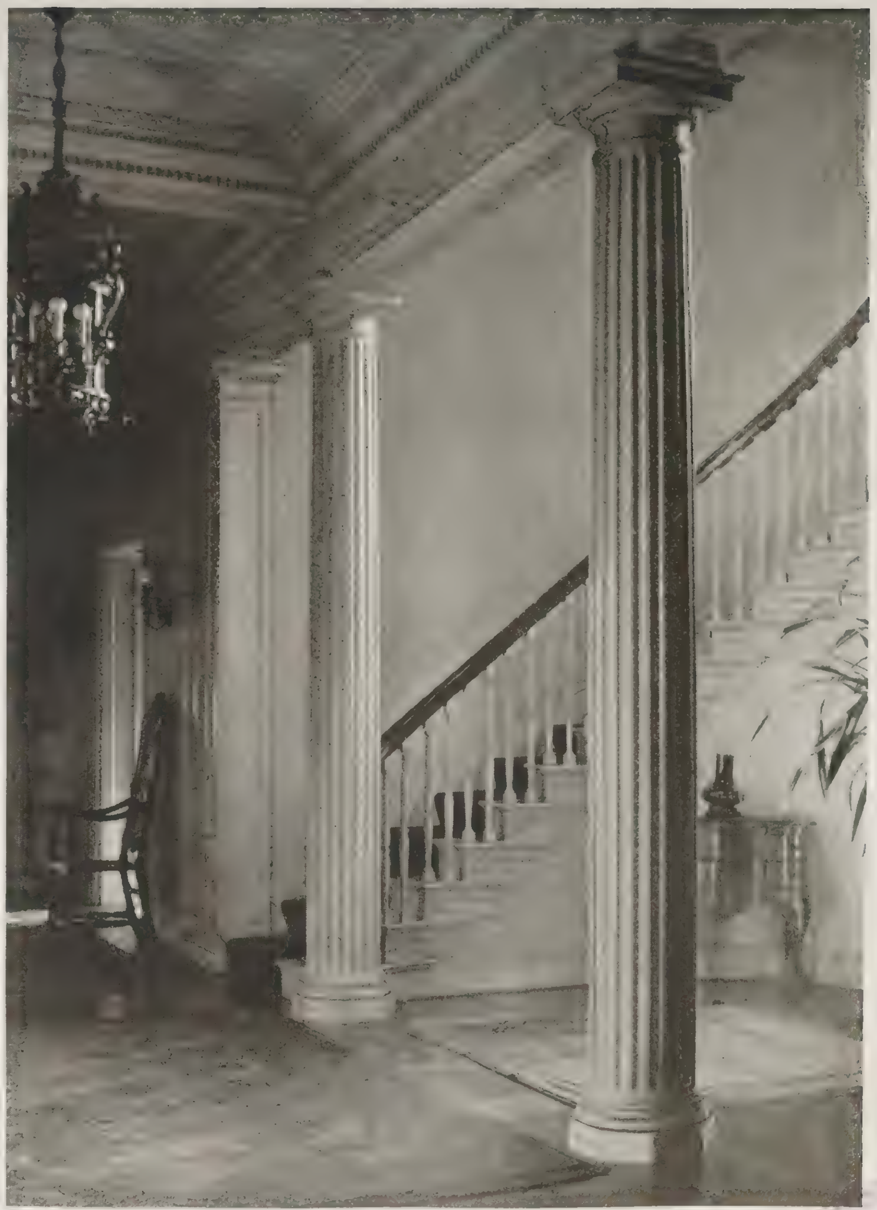


SECOND FLOOR PLAN

## HOUSE OF J. P. TAYLOR, ESQ., RICHMOND, VA.

W. DUNCAN LEE, ARCHITECT


LIBRARY SEEN FROM THE HALL


HALL AND MAIN STAIRWAY

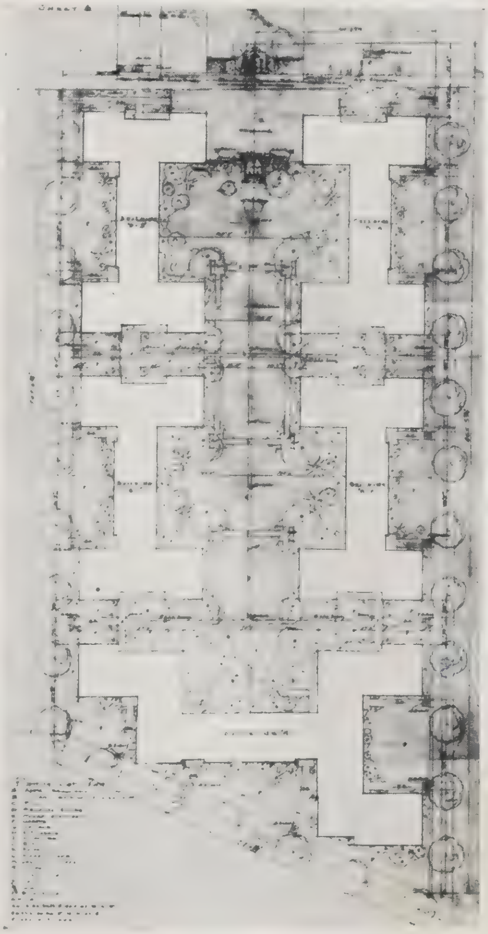
HOUSE OF J. P. TAYLOR, ESQ., RICHMOND, VA.
W. DUNCAN LEE, ARCHITECT

# Model Tenements for Wage Earners at Bayonne, N. J.

ANDREW J. THOMAS, Architect

THAT the housing of the lower paid wage earner must be undertaken as a public service remains equally true whether financed and carried out by municipal governments, as in England, or by industrial corporations or philanthropic institutions, as in this country. The tremendous increase in the population of large cities combined with the great change in economic conditions has completely altered the housing problem of 20 years ago. The need of combating congestion in certain sections of our large cities and manufacturing towns caused by the enormous growth of American industries is of ever increasing importance. Even in old housing, rents are rising until, in many cases, they equal those required to make new construction profitable, even at existing high building costs. To offset these high costs the architect, who is doing more than anyone else to relieve this situation, has brought greater economies into the design.

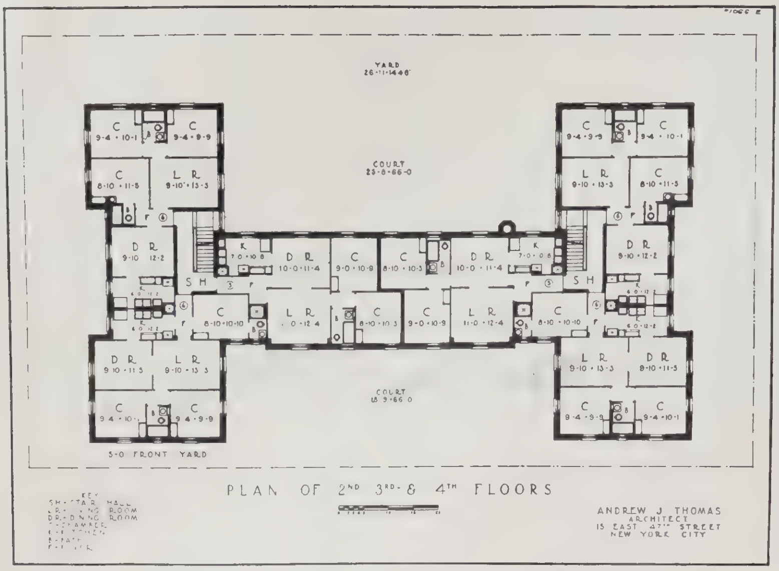
As living expenses have increased proportionately with daily wages, the wage earner of today is confronted with the serious problem of how to house himself. Under the old pioneer formula each man tried to provide his own individual housing as illustrated by the small one- and two-family houses of any manufacturing town built 50 years ago. As the cities grew, at the expense of the country, the resulting and ever increasing congestion necessitated the housing of many families under one roof. This type of housing, although it produced the unhealthful and unsanitary tenements which are still the disgrace of our large cities, is more necessary than ever before. With the cost of land, labor and materials at top figures, rents within the means of the wage earner for housing in quarters healthful, sanitary and equipped with modern conveniences, which every family requires for comfort and contentment, can be procured only by large scale production worked out on the most carefully considered economic and scientific principles.



Plot Plan of Development

It is indeed a public service of vast importance which is being undertaken in Bayonne, New Jersey, by a group composed of some of the largest industrial interests in the United States—oil refineries and manufacturing plants—together with several public spirited citizens. Coöperating under the leadership of the Bayonne Chamber of Commerce, they have an organization to demonstrate ideal wage earners' housing, which is known as the Bayonne Housing Corporation, with George R. Keenan as president and Andrew J. Thomas as architect and superintendent of construction.

After careful consideration of the two-family house, which is characteristic of the workers' housing in New



Plan of Typical Floors

Jersey cities, the Bayonne Housing Corporation adopted the apartment house as the most suitable type for Bayonne. Because of the lack of available land, brought about by the rapid growth of Bayonne, together with the high cost of construction as well as the high cost of operating separate houses, the adoption of the garden apartment type of housing, which combines the advantages of the two-family house with the economy in construction costs of apartment housing, was determined upon. The two-family house is not practical from any economic viewpoint, because it is run by an amateur landlord for his neighbor, and because the cost of land per family, including street betterments, civic service, insurance, taxes and upkeep, is too high for wage earners. Such housing, where a maximum of light, air and space combined with common conveniences can be obtained at a minimum rent for the tenements and a minimum cost to the landlord, is being achieved today through the intelligent combination of the conveniences of a modern tenement with the surroundings of a model apartment, a solution of the housing problem approaching nearer to the ideal than has ever before been arrived at.

In the opinion of Mr. Andrew J. Thomas, who is among the foremost authorities on such problems, this housing will provide the workingmen with a far better type of home than has been thought possible at present construction costs, and, more important still, one which can be rented at a price

View in Garden or Inner Court of Bayonne Development within the means of the average wage earner. The sponsors of the project expect that it will bring a reasonable return on the investment, with no thought of any speculative profit nor philanthropic pose, and that it should not only influence the speculative builder to improve his product but should also have a far-reaching effect in bettering the living standards of industrial workingmen throughout the country. This aspect should appeal to labor in the building trades, since their hearty coöperation is necessary for the complete success of the undertaking, which will benefit labor more than any other class.

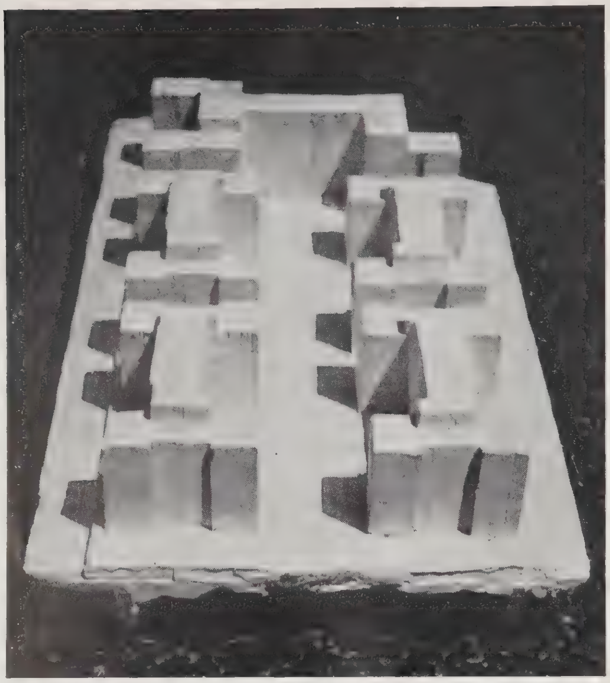
It is a great improvement on the old method of "company housing" in industrial developments, which superimposed the landlord-tenant relationship on the capital-labor situation and which also laid too great a burden on each single industry by tying up too much of its capital in housing. This leads to the dictum, more or less informally stated on the part of housing experts, that industry cannot well be expected to take a hand in solving housing problems except in special cases. This is the first time that several large industries and public spirited citizens have coöperated in a single housing operation. It should pave the way for countless more such combinations in all our industrial centers and large cities where the improper housing of the wage earner is a disgrace to our present social conditions. Such coöperative industrial ownership will forever do away with the evils of company ownership which lead to unjust evictions in time of strikes and discredited "company housing" throughout the ranks of organized labor. In a holding company composed of a group of manufacturers and individuals no single member is able to dictate to the management. A group is apt to be more just and reasonable in the handling of tenants, more careful and public spirited in the proper locating of its housing in regard to convenience to the factories and consideration of city planning, more educational in setting better standards of living, more careful in securing the right kind of tenement laws and proper inspection, and more active in discouraging irresponsible speculative housing.

DREW J. THOMAS · ARCHITECTS N.Y.C.

Children's Playground in Inner Court
Workingmen's Housing at Bayonne

In consequence of the amendment to the Tenement House Law of 1904 recently passed by the legislature of the State of New Jersey, it is now possible through low-cost construction, fireproof stairways, and adequate courtyards to give the wage earner healthful and safe housing at low rentals. This new law marks one more step in the steady development of the problem of better housing for the wage earner. It permits this particular housing project at Bayonne to be carried through successfully, so that without question other interests elsewhere will soon come forward to provide working men with decent homes at low rentals, because they can now do so in the expectation of getting a return on their investments.

Architecturally, the proposed group of buildings marks the highest achievement in industrial housing which is possible at low rentals. Even Mr. Thomas' design for the Metropolitan Life Insurance Company's model tenements in New York, which was hailed as setting a far finer standard of city housing than any previous example, has been improved upon by him in some respects in this Bayonne group, where openness and sunshine, circulation of air, gardens and lawns will make these wage earners at Bayonne as well situated as if they lived in the luxurious garden apartments built by Mr. Thomas at Jackson Heights. Upon the site chosen for the group in Bayonne, which is a large plot of land covering nearly three-quarters of a city block and fronting on three streets not far from the factories, will be erected five apartment houses, including four H-plan units, housing 26 families each, and one odd-shaped unit designed to fit the end of block, housing 45 families and making a total of 149 apartments of five and six rooms each, with bathroom and shower bath for each family.



Model Showing Arrangement of Buildings

Although the Metropolitan Life Insurance housing development at Long Island City and Astoria used only 50 per cent of the occupied area for each typical unit, a saving will here be accomplished making this Bayonne design really cheaper, by reason of fewer stairs in each building and other economies, so that only 35 per cent of the area of the site will be built over, leaving open the other 65 per cent for a large interior garden, side lawns, and street forecourts and setbacks. This garden space, which is obtained by placing the four H-shaped units of the design in similar positions end to end, equi-distant from each of the streets which form the parallel boundaries of the site, is 340 feet long and 51 feet, 10 inches wide at its narrowest width and 104 feet wide at its greatest width, where the courts of the buildings open into it. These courts are 66 feet wide and only 26 feet, 2 inches deep, a great improvement on the usual tenement house court which has here disappeared through the evolution of the rear communal garden. Each building in the group stands free on a plot 100 feet by 144 feet, 8 inches, the 24 feet between the buildings making veritable lawns of these passageways into the gardens. The courts in front of the buildings, similar to those in the rear, are 66 feet wide by 19 feet, 3 inches deep, which added to a 5-foot setback from the building line will give ample opportunity for lawns and planting. The effect of the side lawns, in conjunction with the garden, will be to flood the houses with sunshine, and cause a flow of air all through the group—the principle of "block circulation," as Mr. Thomas calls it.

At one end of this interior garden is a playground for the smaller children, containing a comfort station and all sorts of apparatus for their entertainment. Here a trained nurse or matron is in daily attendance who takes care of the children at a cost to the 150 or more families of three cents a day per family. This innovation in the development of modern housing recognizes a new condition in our cities, where the traffic of the streets is a constantly increasing menace to the lives of children whose only playground in many localities they are. To go to nearby playgrounds, if there are any, a mother can hardly trust her little children to cross the streets alone, nor can she always take the time from her family and domestic work to conduct them there. Unless a special playground is provided within the housing block, the smaller children must remain indoors or play on the sidewalks, which means the street.

The rentals will include steam heat and hot water, which are usually either not provided in wage earners' housing or else are provided by the tenants themselves in two-family and in single houses, and are equal in value to at least $2 a room per month.

The exterior is to be of brick, and the interior of frame construction, except for the stairs which, including the doors, are to be fireproof. Each building will be four stories in height on the wings and five stories in the center, making it possible for 18 apartments to have three or four exposures, and 8 to have two, with cross-circulation for all. The projecting wings and the difference in story heights will make an interesting outline which will be an improvement on the barrack-like, forbidding and monotonous aspect of the solid, unbroken facades, characteristic of streets in tenement districts throughout this country.

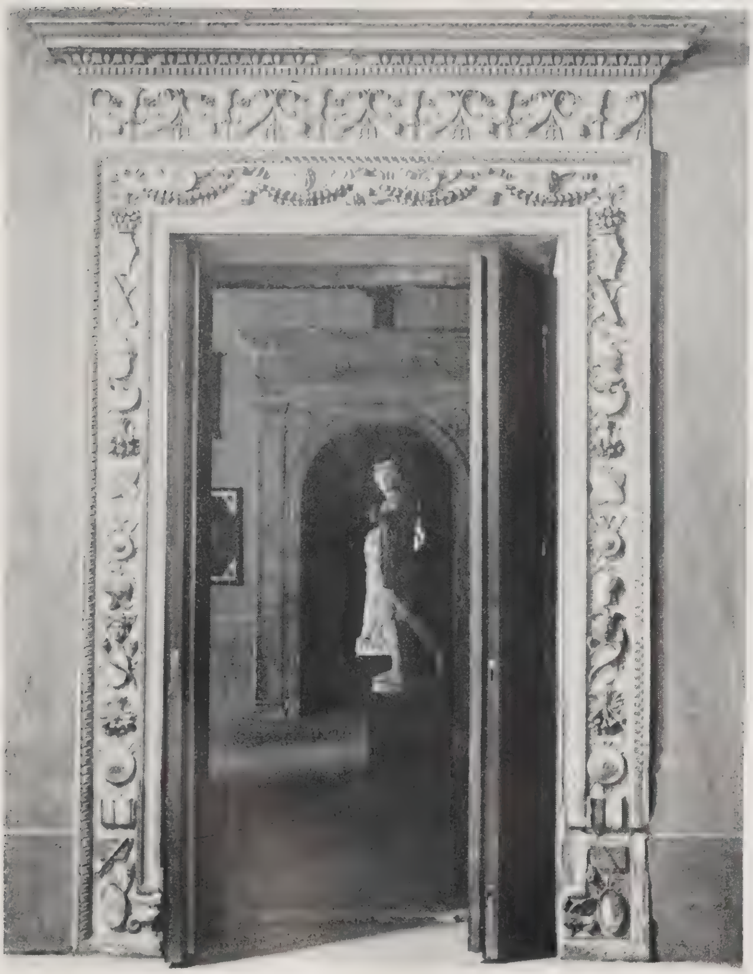
This openness of plan makes the individual homes extremely livable. Even the rear apartments, much like a private house, will jut out into the garden which, together with the side lawns and forecourts, will be planted with trees, shrubbery and flowers.

Notwithstanding all the discussion of the problem of low priced housing, little is being done at present if one excepts the project of the Metropolitan Life Insurance Company, so in this latest housing development, where all interests—capital, labor and public spirited citizens—are coöperating to provide the wage earner with a new standard of livable homes in which all modern improvements are had, Bayonne is setting an example for the entire country.

# ITALIAN RENAISSANCE DETAILS

A SERIES OF MEASURED DRAWINGS

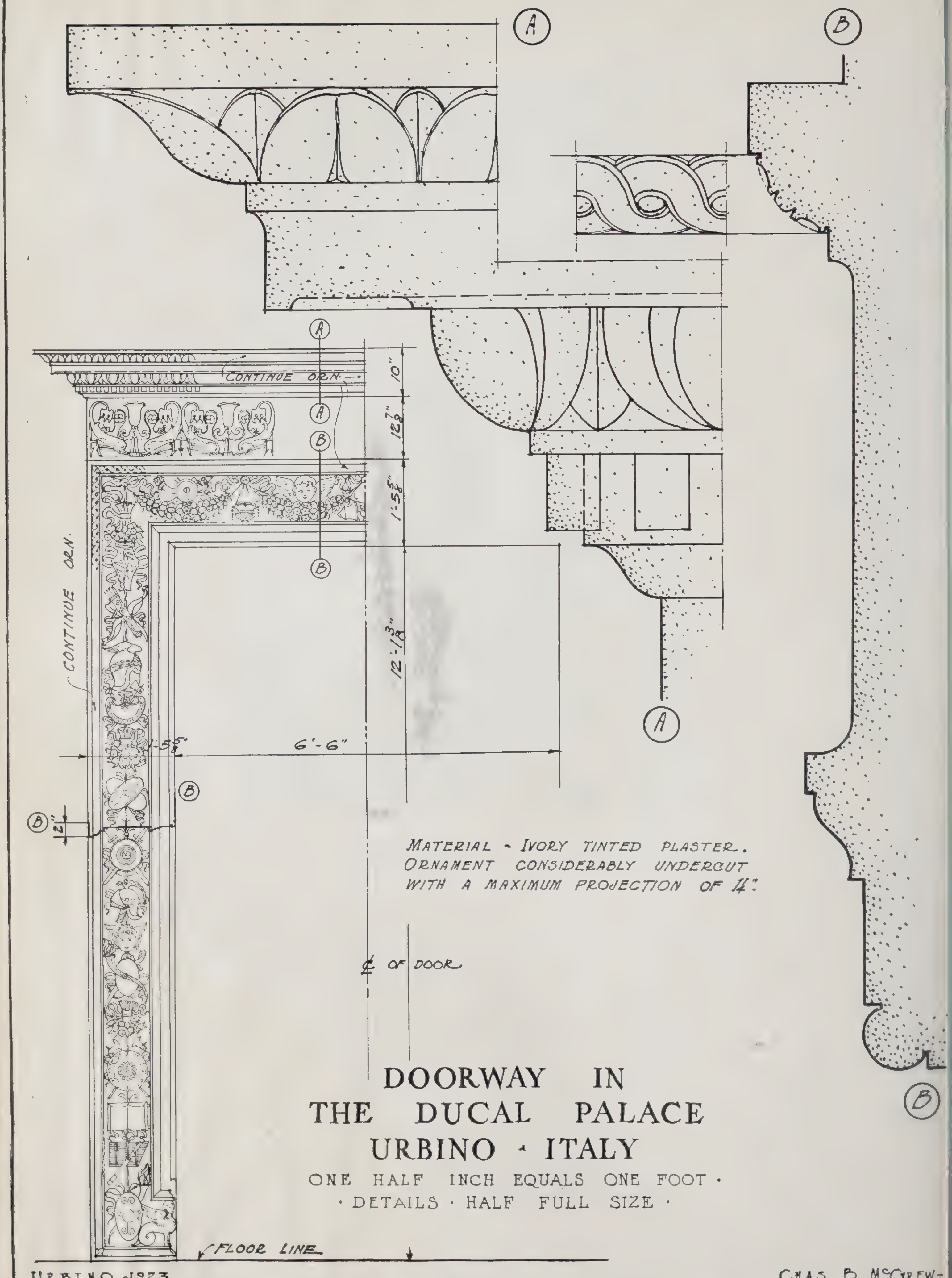
*By* CHARLES B. McGREW



A FIFTEENTH CENTURY DOORWAY
FROM THE DUCAL PALACE, URBINO

RENAISSANCE ornament makes considerable use of the emblems of war, a custom which was a direct inheritance from the antique Roman period. This architrave of a doorway, for example, is ornamented with martial emblems upon its vertical members, while across the top appear the swags and cherubs' heads familiar in all types of Renaissance ornament, and above extends a frieze in which the dolphin motif is conspicuous, the entire doorway being crowned by a cornice which makes use of "egg and dart." The actual doors used within such an architrave are often masterpieces of inlaying in woods of different colors.

Work of this character naturally depends for architectural effect largely upon appropriate surroundings, and the beauty of its carving is greatly enhanced by the toning which comes with age and to which no photograph could do justice. The measured drawing of this doorway is the work of the fourth holder of the Plyn Traveling Scholarship in Architecture, University of Illinois.



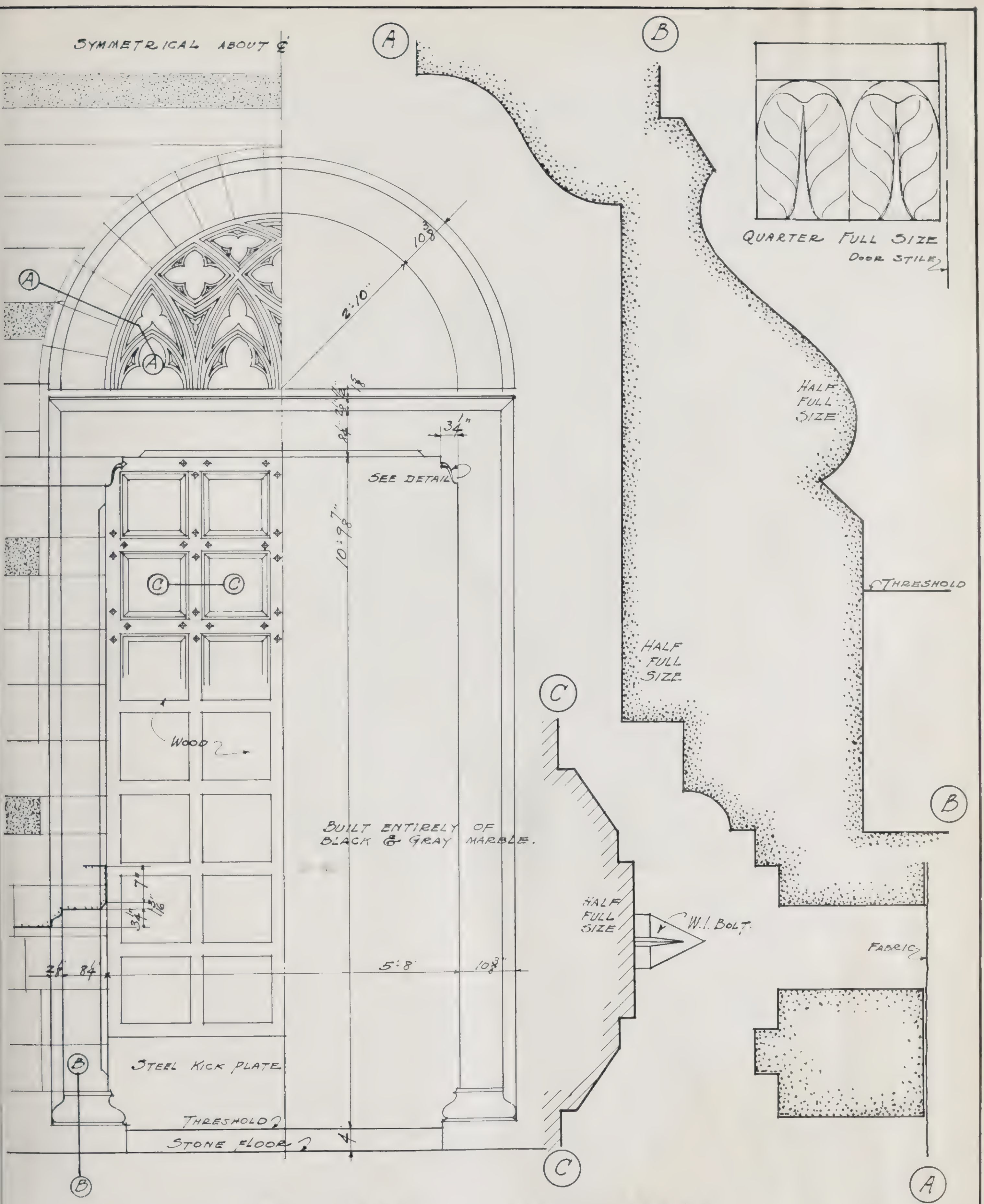
MATERIAL - IVORY TINTED PLASTER.
ORNAMENT CONSIDERABLY UNDERCUT
WITH A MAXIMUM PROJECTION OF ¼".

# DOORWAY IN THE DUCAL PALACE URBINO · ITALY

ONE HALF INCH EQUALS ONE FOOT ·
· DETAILS · HALF FULL SIZE ·

URBINO -1923

CHAS. B. McGREW-



# DOORWAY · CATHEDRAL
# SIENA · ITALY

ONE HALF INCH EQUALS ONE FOOT ·
· SCALE OF DETAILS AS NOTED ·

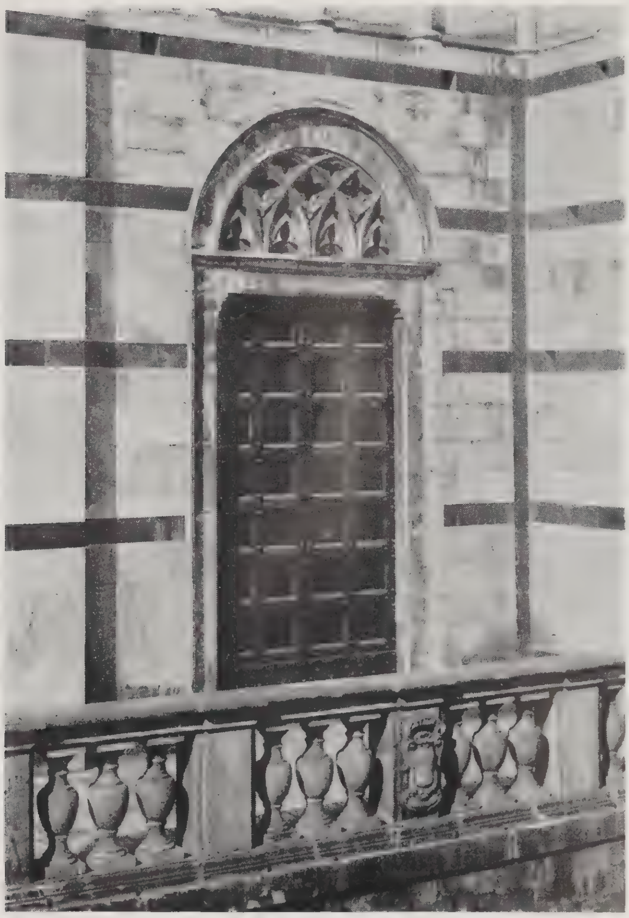
SIENA · 1923

CHAS B McGREW

# ITALIAN RENAISSANCE DETAILS

## A SERIES OF MEASURED DRAWINGS

*By* CHARLES B. McGREW



DOORWAY, SIENA CATHEDRAL

PROBABLY because Italy is so steeped in classic tradition, the Italian architects made little of the Gothic when at the hands of the builders of every other country of western Europe it was being given an individual development. Even when use was made of Gothic forms, they were combined with motifs derived from other sources.

This doorway from Siena Cathedral is an illustration. The details of the jambs suggest those of many old doorways in Lombardy and elsewhere in northern Italy, and the tracery above, while Gothic in form, is reminiscent of the Gothic seen in Venice, which is strongly tinged with the Byzantine, while the doors themselves are of a type found in old churches over all Italy. Nevertheless, the simplicity and charm of the doorway give it a value of its own, since, while it is used in a building intended for ecclesiastical use, it possesses elements which would render it equally appropriate for a structure of almost any other type.

# ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

## Reducing the Costs of Ventilation

*By* C. W. KIMBALL

THE increased cost of materials, fuel and labor results in an increase of cost of heating and ventilating, and this increased cost raises this question, among others,—whether sufficient attention has been given to ventilation and its costs. If equal or better results can be obtained at approximately one-half the cost of the present accepted systems, there would seem to be no good reason to continue using the same methods as in the past.

The present methods of ventilation, generally considered, assume and require taking air from out of doors; heating it during the winter and delivering it into the rooms to be ventilated at a proper temperature without drafts; also providing means to insure the heated air, after being breathed, escaping out of doors carrying with it all the heat in the air plus a considerable amount of heat given off by the occupants of and lights in the room ventilated. Without considering for the moment the purity of this escaping air, we think it is agreed that allowing this heated air to escape beyond recovery is a loss, because heat means coal and coal means money.

Without going into a technical or extensive definition of the term "ventilation" it will be assumed that it means providing an adequate supply of fresh air to and exhaust of foul air from a room or rooms so that the air conditions in the room or rooms will be comfortable, healthful and satisfactory to the occupants thereof. All the more recent tests, experiments and results of research indicate clearly that the proper circulation of air is one of the most vital factors in ventilation, with proper temperature following closely, then coming freedom from odor and proper humidity. In other words, the correct movement of air in and about a room and its temperatures are the most important items, with freedom from odor and proper humidity following.

There is no question but what we all want healthful schools, theaters, stores, factories, etc., but we are also sure that up to the present time too little attention has been paid to the question of operating costs. With coal and labor at the present high rates, it becomes worth while considering how to save all the heat we can without endangering the health and comfort of the occupants of the rooms. In a manufacturing proposition, where the cost of production

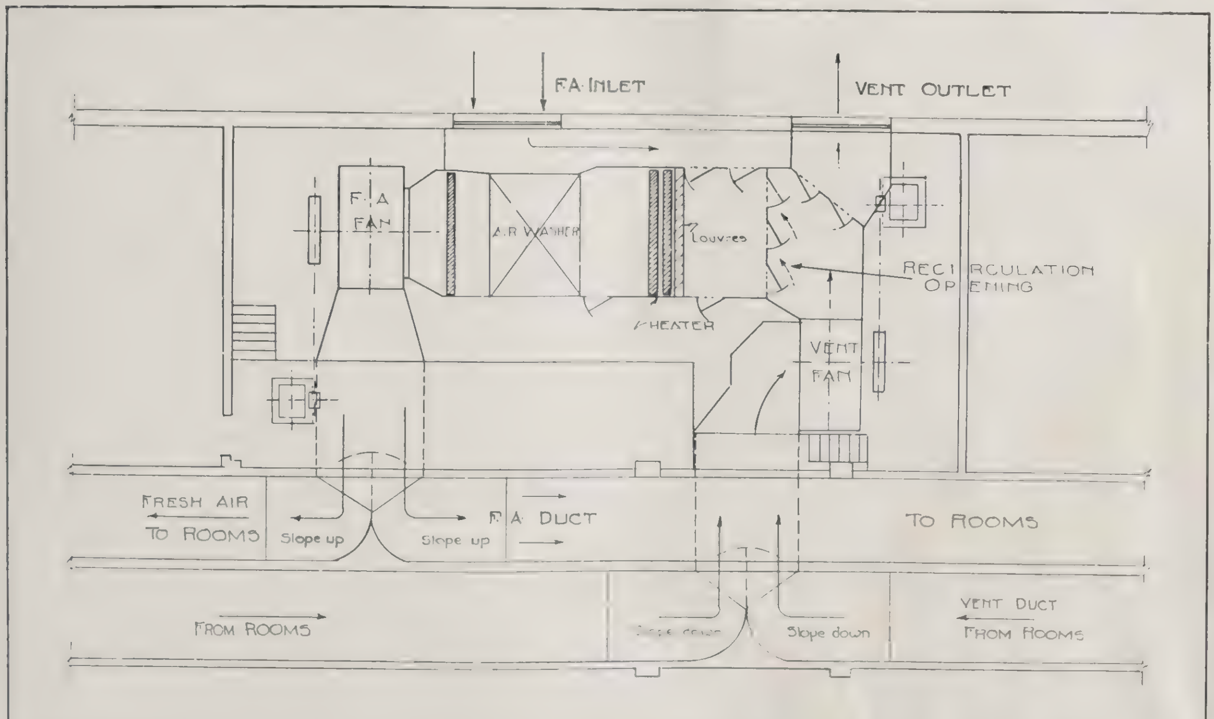


Fig. 1. Air May Be Blown Out of Doors or Diverted into Fresh Air Chamber

must be kept down, any waste as great as the waste of heat due to the present methods of ventilation would be studied from every angle to see if some way could not be devised to overcome and prevent the waste.

In the past it seems to have been an accepted fact that all the air for the rooms must be taken from out doors and heated before being sent to the rooms, and that all the air leaving the rooms must be thrown away. Approximately ten years ago, Dr. J. H. McCurdy, of Springfield Y. M. C. A. College, had a system of ventilation worked out in the new gymnasium there so that he could make actual working tests and experiments to see what could be done to improve the standard methods of ventilation and if possible to decrease the load on the heating system during the cold weather and to reduce to a minimum the waste of heat due to exhausting all the vent air directly to out of doors. This system was based on the idea of re-circulating the air throughout the building except in toilets, lockers, etc., and it has been operated ever since its installation with practically no changes. It has been subjected to all kinds of tests, experiments and examinations, not only by Dr. McCurdy but by others, various committees and interested persons.

To explain more fully what is meant by "re-circulation," we would call attention to the figures included here showing the general scheme of the air circulation in a school and in a theater. These two buildings are taken simply for illustration, and the same ideas may be applied to the ventilation of rooms in structures of other types.

The heated and washed air is forced by the fresh air fan through the ducts to the rooms to be ventilated and delivered into the room at a velocity not exceeding 400 feet per minute. This air circulates through the room to the vent openings and through vent ducts downward as shown in Fig. 1 and connected to the main trunk duct to vent fans. The vent fan and discharge ducts are so arranged that this air may be blown straight out of doors or in cold weather this warm air can be diverted wholly or in part into the fresh air chamber. In this chamber it is arranged, by dampers, to admit enough cold air from out of doors to cool the air from the vent fan. The air then passes on through the air-washer to the fresh air fan and up to the rooms. Otherwise, the vent ducts may all be taken to the attic and connected to a vent fan which is arranged to discharge out of doors or downward through the fresh air shaft to the air-washer and fresh air fan (outlined in Fig. 2). In many buildings the vent fan can be omitted, simply connecting the vent ducts either in the attic into the fresh air flue or extending the vent ducts downward as well as upward and making the fresh air fan do the entire work (see Fig. 3). With this "re-circulation" system it is planned to carry the vents from the toilets, chemistry laboratories, shower baths, etc., out through the roof separately

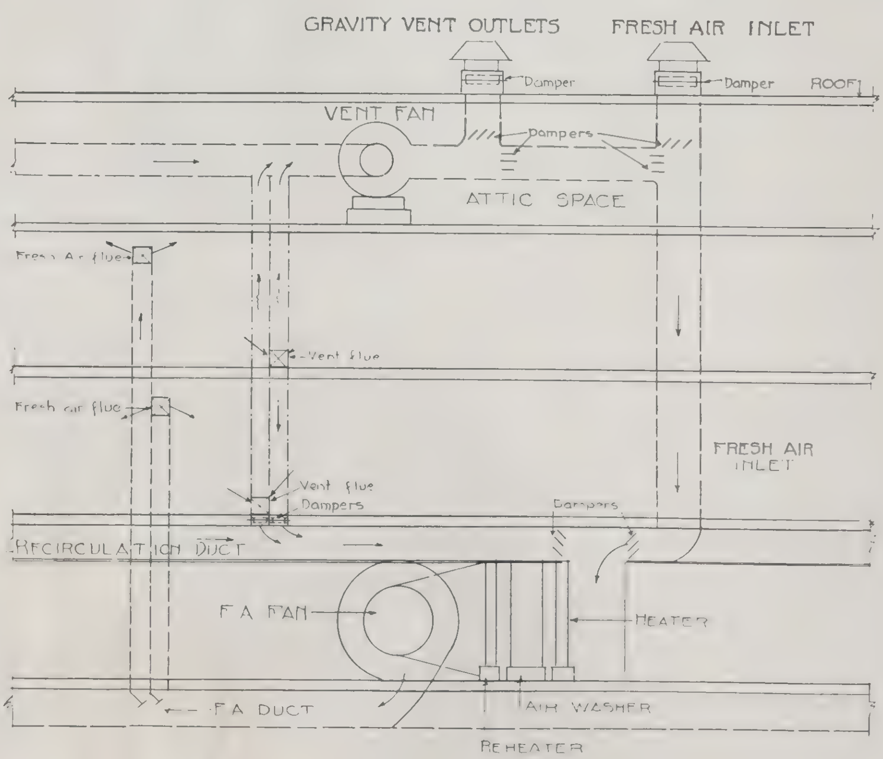


Fig. 2. Air Discharged from Attic or Diverted into Air Washer and Fresh Air Fan

to prevent any trouble due to odors being carried from these rooms into the classrooms, if by any chance the air-washers were not in use.

The same general idea shown in Fig. 2 applies to the theater circulation. In a theater properly equipped it has been found that in cold weather the air can be successfully re-circulated without the air-washers being used except when the theater is crowded. This results not only in a saving of coal but also in a saving of electricity.

As to the question of safety and health with the use of the "re-circulation" system, there seems to be no longer any doubt, as this type of a system has been used and tested in every way for the last ten years at Springfield and has been in use in public schools in Hartford, in Springfield, and many other cities through the South and West, particularly in St. Louis, where the "re-circulation" idea is the standard used in all the schools. Also, several theaters that provide the best and most nearly perfect ventilation have systems based on this idea, it having proved its effectiveness and satisfactory operation with a reduced yearly expense over years.

Unfortunately, the present State Department having jurisdiction over the ventilation in Massachusetts has not officially recognized the "re-circulation" idea, and this undoubtedly has had a retarding effect on its adoption in New England. In other parts of the country the "re-circulation" idea is being used more and more, and as it seems to the writer only a matter of time before it will be recognized elsewhere, this type of ventilation should be considered when designing buildings, particularly those calling for a large volume of air.

As an example of cost of ventilation using the present Massachusetts Standard system for schools, figures show that a school designed for 1,200 pupils throws away heat units, conservatively figuring, equivalent to approximately $1100 or $1200 per winter. If we multiply this by the number of similar schools throughout the state, the loss seems to raise a decided question as to whether the present methods can be considered proper and businesslike.

To further express the wastefulness of the present system of ventilation in the school mentioned it should be noted that the areas of the gravity vent flues through the roof total approximately 200 square feet. This is practically equivalent to taking off 200 square feet of roof each day and expecting to heat the building comfortably with all the heated air escaping.

To illustrate further, take a theater seating 4,500 people operating from 1:30 to 10:30 on a day with an average outside temperature of 20° and supplying 15 cubic feet of fresh warmed air per occupant per minute heated to final temperature of 70°. This means with the present standard system, exhausting all the air out doors, that heat equal in round numbers to 4,200 pounds of coal per day is being sent up through the roof and lost. To this expense must be added the cost of operating the system, also interest and investment on the larger boiler plant.

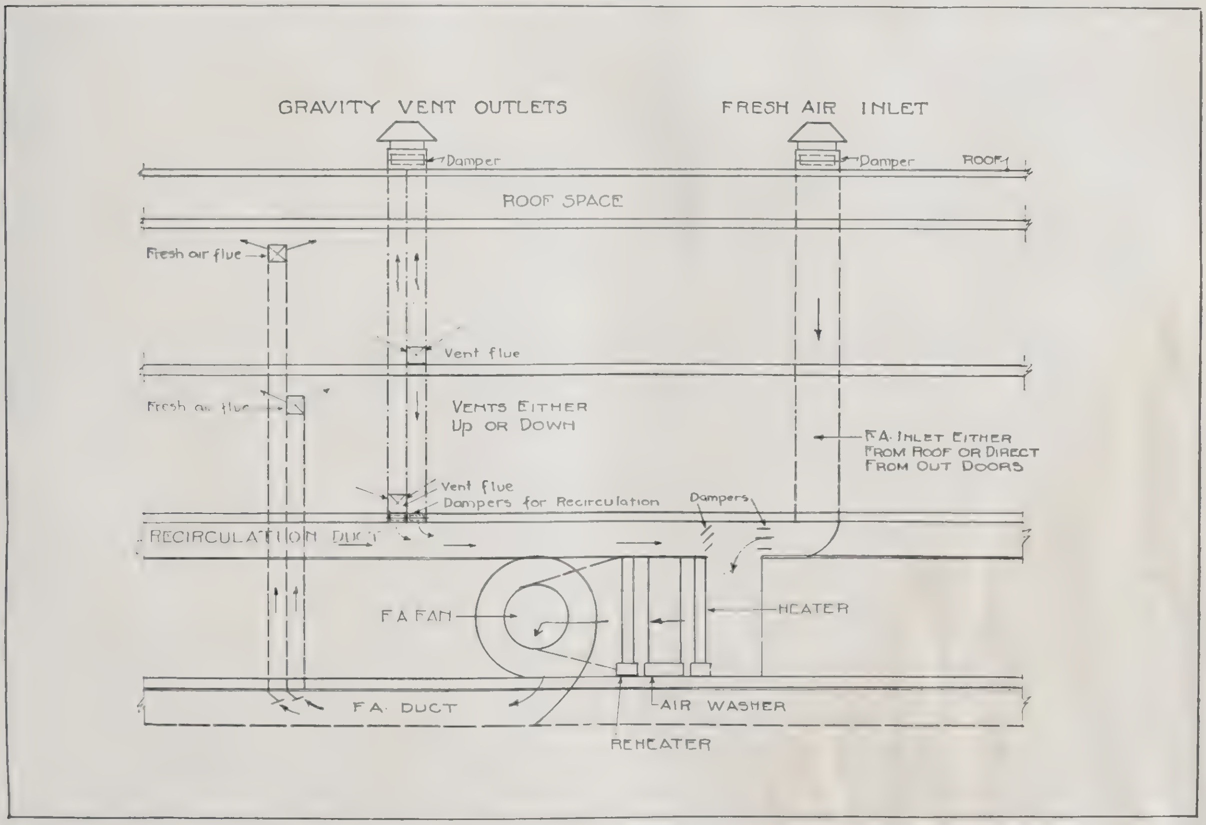


Fig. 3. A "Re-circulation" System to Carry Vents from Toilets and Laboratories

For theaters even this excessive waste has, in the past, seemed necessary and worth while, but as already said, it has been found possible to save all this loss by designing the ventilation system on the basis of "re-circulation," cleaning and washing this warm air, thus conserving all the heat units.

Another feature of ventilation which has a bearing on this re-circulation idea and which is rapidly coming to the attention, especially of theater owners, is the question of adequate ventilation and cooling of theaters for summer use. Some engineers have had the opportunity of watching both the cooled and uncooled theaters and noting the effect that the inside temperature and air circulation have had on the box office receipts. In the past the hot summer season has been by far the least profitable part of the theatrical year for theaters, except at summer resorts, but the experience of certain Chicago theaters proves that with a real system of ventilation and including properly cooled air, it is possible to change all this. The ventilation and cooling systems have made the summer season in these theaters even more profitable than the winter season, thus greatly increasing the whole year's profit. The success of the ventilation system with its heating and cooling plant is based on re-circulation of the air, as it has been found impractical to use all outside air either winter or summer, due to the excessive cost of heating in the winter and of cooling in the summer.

As to the possibility of using this re-circulation system, it has been found that with proper planning, when the buildings are designed, the ventilation system can be so adapted to the building that the actual cost of the entire structure is even less with the re-circulation system than with the present methods. The boiler plant can be made smaller, the piping less expensive, and the duct and flue system, properly planned to fit into the building, will cost but little if any more than with the present methods. After the buildings are built and put in use, the expense of operation is in some cases reduced from 40 to 50 per cent, making a yearly saving that will speak for itself.

As an example of this, one theater was equipped with a satisfactory re-circulating system handling 30,000 cubic feet of air per minute to the theater, and after several years of operation the results show that satisfactory ventilation has been secured and practically no more coal has been burned than was the case the years before when there was no fresh air supply and the ventilation was unsatisfactory. Also a large school in Hartford, well equipped with a real re-circulating system, has been operated satisfactorily and unusually economically for the last six years. This building has approximately 1,650,000 cubic feet of space, and the fans deliver 50 cubic feet of air per occupant per minute, or a total of 74,000 cubic feet of fresh air per minute. Only one 110 h.p. boiler is used during the entire winter. Compare this with a Massachusetts Standard building of approximately the same cubic feet of space with fans delivering only 30 cubic feet of air per occupant per minute, or a total of 72,000 cubic feet per minute and using two 150 h.p. boilers during the entire season.

The economy and efficiency in ventilation by re-circulation, as demonstrated by Prof. Larsen of the University of Wisconsin and the New York Ventilating Commission, have been repeatedly realized by other users of this method of ventilation. In some cases the season's cost for fuel with the re-circulation system in use has been found to be but 40 per cent of the cost of fuel when using outside air. The cost of the operation of such a re-circulating system then becomes materially less than is the cost of operating the window ventilating system, for which low operating cost is claimed.

From this it will be seen that it has been demonstrated fully that with a properly planned and installed re-circulation system of ventilation, equal or better results can be obtained with re-circulation ventilation at approximately one-half the cost than with the present standard system of all outside air "in" and all inside air "out," and let it cost what it may.

Another feature which should be seriously considered in connection with ventilation is the fact that there is a decided tendency among the operators, during the cold weather, to slow up or even shut down the ventilation system when designed to take air from out of doors. During the cold weather opening the cold air windows and starting the fans bring an added heavy load to the boiler plant, which is already being taxed above the average to supply steam to the direct radiation to heat the building. Furthermore, not using the ventilation system during this weather makes a marked showing on the coal records and this reduces the yearly fuel cost. With a re-circulation system, the starting of the fan or fans without taking in any outside air does not materially increase the load on the boilers as just noted, but immediately begins to help heat up the entire building and thus becomes a very material help toward making the building comfortable both from the standpoint of heating and that of ventilation.

This feature makes possible a reduction in the amount of direct radiation required in the rooms, a reduction in the boiler power required for the whole building, and as the ventilation system (by re-circulation) becomes a part of the heating system, its operation becomes assured, whereas with the older type, since the ventilation can be shut down without affecting the heating and with a direct saving in the cost of operation, the occupants of the rooms are quite likely to go without during the cold weather.

# Handbooks; Their Use and Abuse—II

*By* E. N. PIKE

IN a previous article, in the March issue of THE FORUM, reference was made to some of the results of use of structural steel handbooks by inexperienced designers. Plate girder design furnishes a large percentage of the blunders of the amateur. Probably 75 per cent of the graduates of our technical schools, in applying for their first opportunities in structural design, will solemnly assure you of their ability to design girders. In justice to our schools it should be said that many of them make good the claim, but unfortunately neither school nor handbook gives much information for the feats of ingenuity that the structural designer must perform to keep within the limits fixed by architectural requirements.

There are at least five very common errors made in designing girders:

(1) The selection of a web too thin for shear or for sufficient bearing value for rivets,

(2) Flange sections that are not well proportioned in the relative area of flange angles and cover plates,

(3) Using cover plates under conditions where it will be impossible to develop the strength of plates in the distance between the ends of successive plates,

(4) Unsupported or insufficiently supported compression flanges,

(5) Improper or uneconomical arrangement of stiffeners.

As most of these conditions may be regulated more or less by building codes, no definite rules will be given here.

Economical design is very often quite as much a matter of keeping down labor cost as it is of using the minimum of material. The use of too thin a web, if it necessitates reënforcing plates with necessary fillers, may result in using more metal than necessary for a web of sufficient thickness, requiring not only more metal but also more labor.

A flange section with about one-half the area in angles is in very good proportion, but often impossible. It then becomes a matter for experienced judgment to fix the proportion. Where to begin to use cover plates is often a matter that does not receive intelligent handling. It happens not infrequently that a girder designed with too thin and narrow cover plates is weaker than the girder without the plates, the effect of holes in tension flange having been overlooked.

If architectural conditions limiting the depth of shallow girders carrying excessive loads or heavily concentrated loads near the end are fixed without careful study of girder details, a condition frequently results that may be impossible to overcome, or which will be so expensive to meet as to be prohibitive. For example, suppose that the web of a girder may be 30 inches deep, and the total depth over all is not to exceed 36½ inches, with a width of covers not to exceed 14 inches. Using 8 x 6 angles of maximum thickness and a web of say 1-inch thickness with reenforcing plates outside of angles of perhaps ¾-inch thickness, is about the maximum that can be accomplished without cover plates. If the required strength can be obtained by the addition of 3 inches of covers top and bottom, the problem appears to be solved. But it may still be impossible to put in sufficient rivets to develop the strength of the various members within the limits fixed by position of loads. Rivets in the web will have four shears; and if spacing to suit stiffeners does not unduly reduce the number of rivets, there may be no difficulty here.

The covers may present insurmountable difficulties if the space is short. If the 3 inches of plate is to be made up of four ¾-inch plates with a unit stress of 15,000 in compression, twenty-six ⅞-inch rivets will be required to develop each plate; this will require about 21 inches, and for four plates, 7 feet. If the distance available is less than 7 feet, the condition becomes practically impossible, for the amateur at least, and the depth should be increased. The tension flange may require slightly more space, depending upon unit stresses and the degree to which section is maintained. A girder such as has been described is not unusual, and the section suggested does not entirely exhaust the resources of an experienced designer, but they represent a limit which the amateur should approach with caution, and beyond which he should seek advice.

Proper support of compression flanges is difficult to secure in many cases. If not obtained, proper allowance must be made in unit stresses, and the maximum ratio of width to length should be fixed with regard to nature of loading, whether quiescent or otherwise.

It will be useless to attempt advice regarding allowable spacing of stiffeners. The building code may tell us what to do. But even here the fashions change, and webs that yesterday required stiffeners today may not so require, or vice versa. In the absence of other requirements the formula $d = 85t\sqrt{\frac{18000}{s}} - 1$ may be used; d=distance between stiffeners; t=thickness of web; s= shear per square inch; d should not exceed 6 feet if depth between angles exceeds 60 times the thickness. Stiffeners at concentrated loads and at bearings should be proportioned with care, although it frequently appears that they were fixed by chance or guesswork. Under ordinary conditions the value of rivets connecting stiffeners to vertical leg of flange angle may be considered a part of load to be carried by stiffener. The use of fillers over flange angles to clear fillet may be advisable sometimes to allow both legs of stiffener angle to be counted at full bearing value. In this case the rivets described should not be considered.

For the type of girder described in a preceding paragraph it will be evident that a considerable portion of a superimposed load will be carried into the web by rivets through flange angles in the space immediately under load, and that this amount should be deducted from the load for which stiffeners are proportioned. For this condition and also for the top flange of crane girders carrying heavy wheel loads, it should be remembered that the resultant of the horizontal and vertical shears on a rivet should be used in determining rivet spacing.

Some attention must be given to diameter and length of rivets required for girders such as we have been considering. Specifications frequently limit the grip of rivets to five times the diameter, and specify an increase in number if this ratio is exceeded. It will usually be no hardship to require ⅞-inch rivets for grips of from 3 to 4½ inches, and 1-inch rivets for 4 to 6 inches, and to use the rule for excess grip only when absolutely necessary. With the best intentions, the designer frequently finds that due to stiffeners and framing connections the thickness of metal is too great. If unavoidable, this condition calls for turned bolts and holes drilled in the solid or subpunched and reamed.

Whether to use a girder or a truss is often a perplexing question, and no very definite rules can be given. The girder lends itself readily to convenient connections, and for the same depth is perhaps more rigid at a slight increase in weight over the truss. Its simplicity of details may decrease the cost sufficiently to offset the increased weight. For supporting a roof where steelwork is exposed a truss may be preferable on account of its lighter appearance, and in many instances its open spaces readily permit the passage of ducts and pipes.

While the engineer would often welcome some legal prohibition of girders and trusses of too little depth, he hesitates to fix the ultimate limit to which he will go. Somewhat depends upon the situation in which they are used and the degree of rigidity necessary. A plate girder with uniform load on 60-foot span, 30 inches deep, at 16,000# fiber stress will deflect about 2 inches; at 8,000# fiber stress, about 1 inch. If the depth is 5 feet, the corresponding deflections are reduced one-half.

A considerable vertical motion is therefore possible, depending upon the proportion of live load to the total. A deflection of $\frac{1}{360}$ of span is generally permissible so far as effect upon a plastered ceiling is concerned, but girders are frequently used in positions where they must carry vertical walls with plaster as well as horizontal ceilings. It will be evident that the vertical plaster may suffer severely from a deflection that will not affect a ceiling.

In the design of trusses, and especially roof trusses, more metal is intentionally wasted than in any other way. The designer hesitates to use single angles in the web for fear of criticism, or perhaps on account of appearance. If the design is made by the steel fabricator, he hesitates to use a single angle, fearing the criticism that he is skimping his work. In many instances in light trusses single angles would suffice for all the web members at a considerable saving of steel and labor. The inexperienced designer, however, very often overlooks conditions that require two angles, as for example the web member meeting a knee brace should be of adequate size. Too often the knee brace is merely added to the design without regard to its effect upon the truss or column. If the purpose of the knee brace is to resist wind, its effect upon both column and truss should not be overlooked.

In determining the outline of trusses for pitch roofs it is not uncommon to disregard more or less at end supports the proper intersection of reaction and strain lines of rafter and bottom chord. It is not always convenient to do this properly, nor is it necessary if the effect of such variation is recognized and provided for. The detail at this point is often deficient in transverse stiffness when the gusset is thin and short. Rivets in the bottom chord should be determined by the resultant of chord stress and reaction if the bottom chord rests directly upon the support. Gussets are often badly proportioned with little regard to work to be done. An old time rule requiring the use of hitch angles if more than five rivets are required for a member, is one that may be followed in spirit if not in letter. This, however, is too often disregarded where most needed, at supports and ridge or hip joints of top chords of heavy trusses. If gussets cannot be brought above chord angles to receive hitch angles, some other equivalent should be devised. Bent plates outside a hip or ridge joint do not make a theoretically satisfactory splice. The experienced detailer usually feels that he can lay out gussets by his sense of proportion, but for heavy stresses near the edge of a plate it is very easy to be mistaken.

In the light of all the common errors mentioned, it might seem that failure of steel structures would be very frequent. This would undoubtedly be true were it not for the fact that assumed live loads are often in excess of actual conditions over the entire area of structure. Dead loads are usually more accurately known, and are often underestimated.

The old time allowance of 25 per cent increase for stresses due to combined bending and direct stress, may nowadays be too close to the elastic limit for real safety. We are accustomed to think of the elastic limit as about one-half the ultimate strength; there is, however, none too much data as to the behavior of members made up of several parts, and probably about 24,000# per square inch is a safer assumption for usual conditions and workmanship.

Of course the handbook cannot compensate for a lack of knowledge of mechanical principles, but it is indispensable as a labor-saver in furnishing the data for nearly all the details of design referred to.

# EDITORIAL COMMENT

## NEW YORK'S WAR MEMORIAL

SINCE the plan of the Mayor's Committee on Permanent War Memorial of the City of New York was submitted last January to the Board of Estimate and Apportionment, two distinct controversies have developed—one over the suitability of the location selected, and the other over the appropriateness of the design accepted. In both decisions the public and the profession seem to feel that the Mayor's Committee has ignored their wishes and suggestions as set forth in various reports submitted during the past five years by the Municipal Art Society, the Chapter of the American Institute of Architects, the Fine Arts Federation, the Art and Executive Committee, and the Jury of Artists. From these several reports as well as from the report submitted to the Mayor of New York at the close of last year by Rodman Wanamaker, Chairman of the Mayor's Committee, a brief history of the undertaking to erect in New York a War Memorial may be obtained.

Upon the signing of the Armistice on November 11, 1918, Mayor Hylan appointed Mr. Wanamaker to form and to head a large committee of representative citizens, henceforth known as the Mayor's Committee on Permanent War Memorial. From this committee Mr. Wanamaker at once selected an Art and Executive Committee, with Paul W. Bartlett as Chairman, which proceeded immediately with the erection of a temporary Arch of Victory from the designs of Thomas Hastings, architect, on Fifth Avenue at 24th Street. This arch of plaster, which greeted our returning soldiers during the spring and summer of 1919, so appealed to many citizens that a movement was started to preserve it in permanent form, and for this purpose a large amount of money was privately contributed. This fact has perhaps influenced the Mayor's Committee in its final decision to accept a design containing a repetition of the arch motif.

It was not until November 1, 1919, that definite steps were taken to hold a public hearing for the submission of suggestions or plans as to what form a permanent war memorial in New York should take. Following this public hearing on November 18 of that year, the Art and Executive Committee invited the public, the art and patriotic societies to submit suggestions or plans in open competition of ideas for a permanent war memorial, and selected a Jury of Artists consisting of twelve of New York's leading sculptors, painters, architects and authorities on art who should judge the proposals.

In response to the announced competition for ideas some 67 suggestions were received and exhibited to the public at the City Hall in February, 1920. The Jury of Artists under the Chairmanship of Edward Robinson, one of their number, viewed the submitted suggestions for the memorial, held a number of meetings, and finally reported April 15, 1920, that no proposal in all details as submitted was sufficiently meritorious for the Jury of Artists to recommend its adoption to the General Committee, but that considered broadly, the competition had suggested several types of memorials worthy of consideration—"a memorial arch, a cenotaph, a statue or sculptural group." The most important point brought out both in the report of the Art and Executive Committee as well as in the report of the Jury of Artists was that an open competition should be held under the auspices of a new committee to be appointed by the Mayor to be made up of members of the principal art, architectural, sculptural and engineering societies of New York. The method to be followed in holding this competition was clearly stated in the report of the Jury of Artists as well as the recommendation that a careful survey should be made of all possible sites in the City of New York suitable for the memorial.

Some time after this report, submitted by the Jury of Artists on April 15, 1920, the Mayor's Committee approved of the first idea that the memorial should be in the form of an arch. After continued deliberation this committee reached no decision as to a suitable location, and the Mayor's Committee itself ceased to exist with the resignation of its Chairman, Mr. Wanamaker, on December 23, 1921. The following April Mayor Hylan again appointed Mr. Wanamaker as Chairman of a new Committee on Permanent War Memorial which again took up the deliberation on the design of an arch or arches and the site to be chosen, finally accepting without competition of any sort the design submitted by Thomas Hastings, architect.

That a dispute involving so much dissension and criticism should have arisen in connection with an undertaking of foremost civic interest is unfortunate indeed. A War Memorial erected without the approval and support of public sentiment would fail in its intended purpose. To end this dispute once and for all the present plans should be abandoned and steps immediately taken, first to select and secure a suitable site outside of Central Park, and, second, to hold a new and nation-wide competition based on a definite program as set forth in the report of the Jury of Artists on April 15, 1920, which seems to have been pigeon-holed and forgotten in the archives of the City Hall.

# Plate Description

Temple Beth-El, Detroit. Plates 73, 74. The exterior of this well planned and thoroughly equipped temple, designed by Albert Kahn, shows an application of simple classical forms to a building simply designed. The doors which open from the colonnaded portico lead into a shallow vestibule which in turn opens into the main auditorium. Here the seats are arranged in the form of a semicircle, with more seats in a gallery.

Floor plans of the temple make provision for the different forms of social service which many religious bodies render today. Part of the building is four stories in height, and upon these floors are arranged departments of different sorts. The basement, in addition to the usual boiler and furnace rooms, contains a dining room equipped with kitchen and pantry and accessible from the other floors by stairways and elevators, and lockers, toilets and showers in connection with a gymnasium. The larger part of the main floor of this portion of the building is given up to an assembly room with stage and footlights, while upon the second floor there are classrooms, library and sewing room, and a choir room which opens directly upon the singers' gallery in the main auditorium. Upon the two upper floors there are more classrooms, board rooms, and offices for the rabbis and their secretaries.

House of William J. Hamilton, Esq., Flushing, N. Y. Plates 75-77. In this residence, of which Roger H. Bullard is architect, there is seen the continually growing tendency toward the following, in domestic architecture, of definite historic types. The house is of a kind which might have been built in Virginia, Maryland, or in any one of several of the New England states during the latter part of the eighteenth century, of brick with roofs of slate and with wood used for the exterior trim, including the architrave of the main doorway with its pilasters and broken pediment. Choice was made of brick possessing considerable texture, and with richness of color, particularly in the headers. The slates upon the roofs are of variegated colors and different thicknesses.

The plan of the main floor is such that as one enters the house the arrangement of the rooms and the extent of the size of the house are at once seen, and the service departments are more completely separated from the rest of the house than is generally the case.

Home of J. P. Taylor, Richmond, Va. Plates 78-80. Walls of this large house, designed by W. Duncan Lee, are covered with stucco of fairly rough texture, while the roofs are of tile. The arrangement of the building with a central three-story pavilion flanked by wings of two stories affords a structure sufficiently large to be given a somewhat formal treatment which is continued within, where a highly dignified stairway faces the main entrance, and upon the main floor a wide hallway extends across this main axis, the different rooms opening from it.

Erratum. We regret to find that by an oversight credit for designing the lectern and pulpit of St. Paul's Church, Newburyport, Mass., illustrated on pages 182 and 183 of The Forum for April was incorrectly given. The designing of both was done, we are informed, in the office of R. Clipston Sturgis.

"Sketching in Bruges," Belgium

Photograph by Harold C. Whitehouse, Architect

# DECORATION & FURNITURE

## Details of the Small Library, Hotel de Chaulnes, Paris

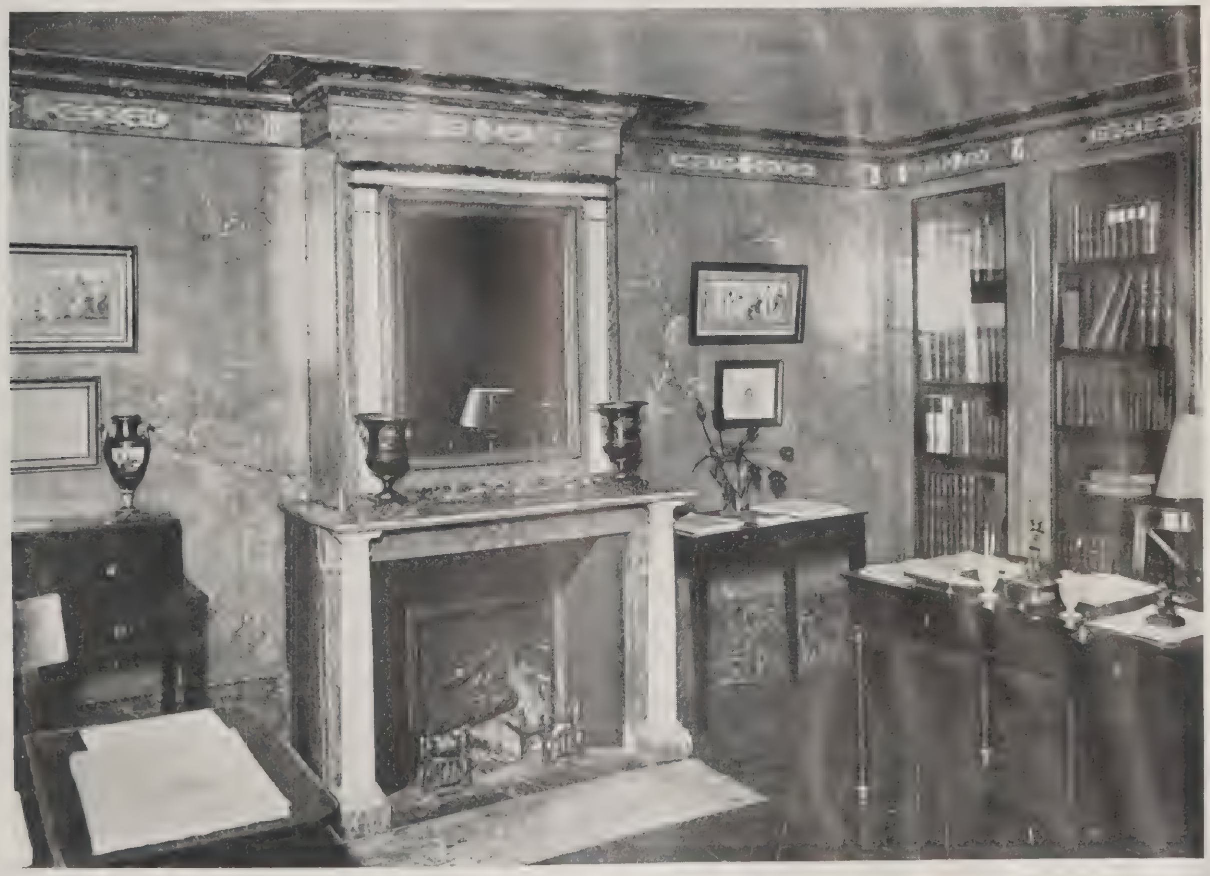
### A CHARACTERISTIC INTERIOR IN THE STYLE OF THE EMPIRE

*Described and Drawn by* C. HAMILTON PRESTON

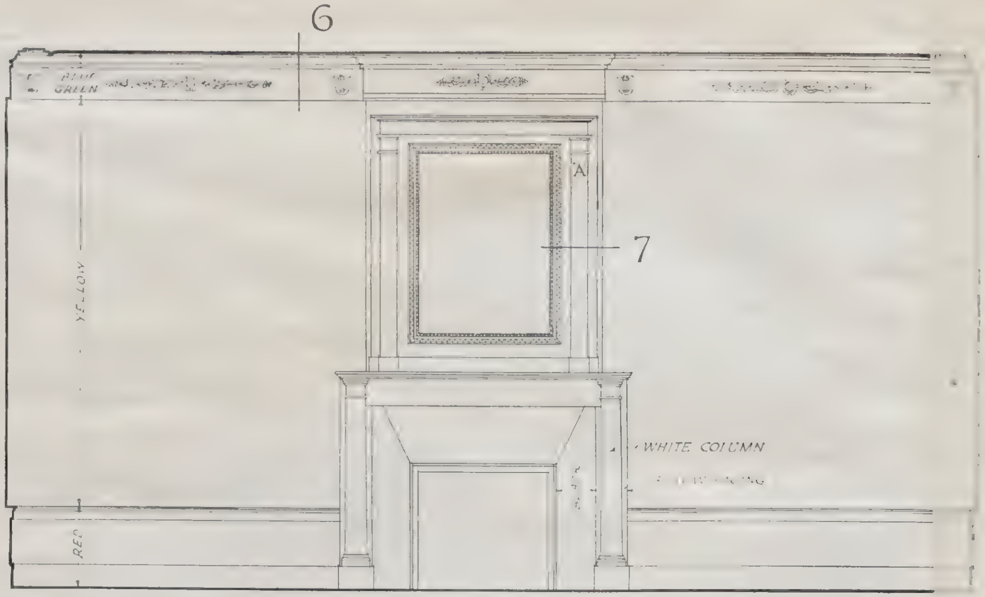
THIS charming little library of the "Style Empire" is found at *No. 9 Place des Vosges,* in the Hotel de Chaulnes. In the first part of the seventeenth century this hotel belonged to the Sieur Fougeu Descures, counselor to the king and field marshal of the armies of France, by whose heirs it was sold in 1644 to Honore d'Albert, Duc de Chaulnes. Thereafter follow a long line of successors, among them the Duc de Luynes and the *famille* de Nicholay, until in 1858 we find it occupied by Mlle. Rachel, the illustrious tragedienne.

The interiors of the hotel have been done over at different epochs, as indicated in the grand salon where are found mouldings of the epoch of Louis XIV, with ornamental details of the last years of the reign of Louis XVI and panels of arabesques in relief, with beautiful designs of cupids and eagles combined with flowers, and also in the dining room where niches occur with pediments of Louis XVI detail and exquisite over-door panels of Louis XVI carving, together with mouldings of Louis XIV character.

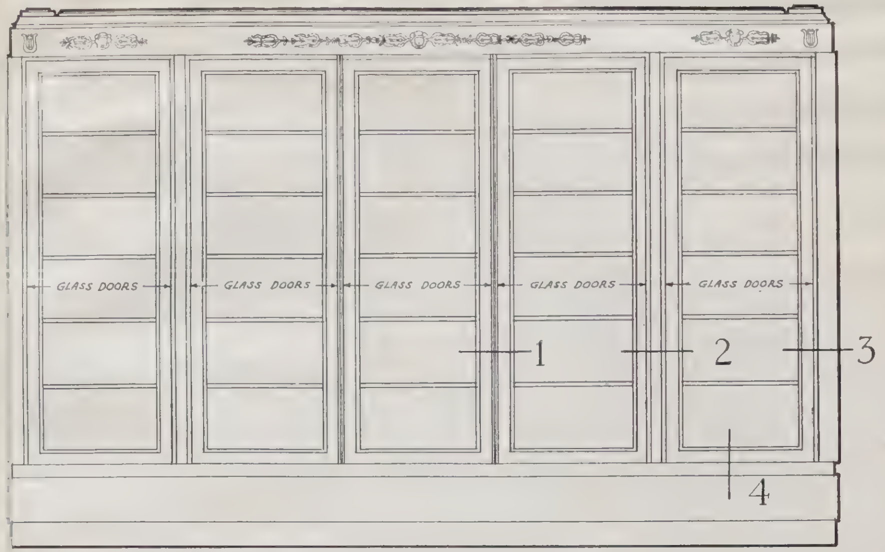
The little library here presented, which was remodeled in the "Style Empire," is very simple in design but rich in color and marbleizing throughout. The entire dado is deep red, somewhat the color of bloodstone, with grayish veinings; the walls are rich yellow with variegated veinings; the cornice background is grayish blue-green, quite deep in tone, and the carvings, in relief, are cream white. Certain of the mouldings of the cornice as indicated are picked out in red of the same shade as the dado. The mouldings around the glass of the bookcases are pale Indian red. The mantel with its rather deep gray bases, white marble columns and yellow facings makes a pleasing contrast with the marbleized walls.



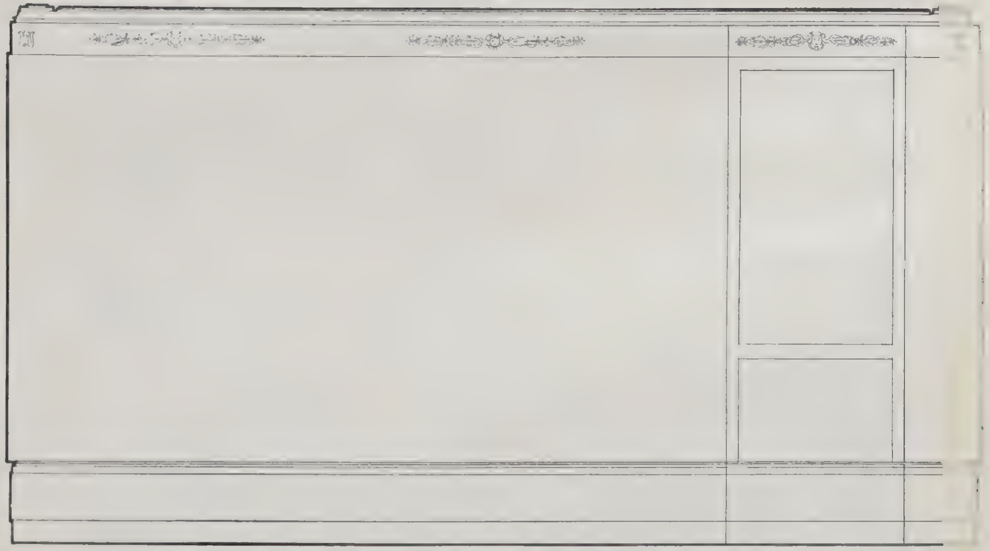
Empire Decorations in the Hotel de Chaulnes, Paris



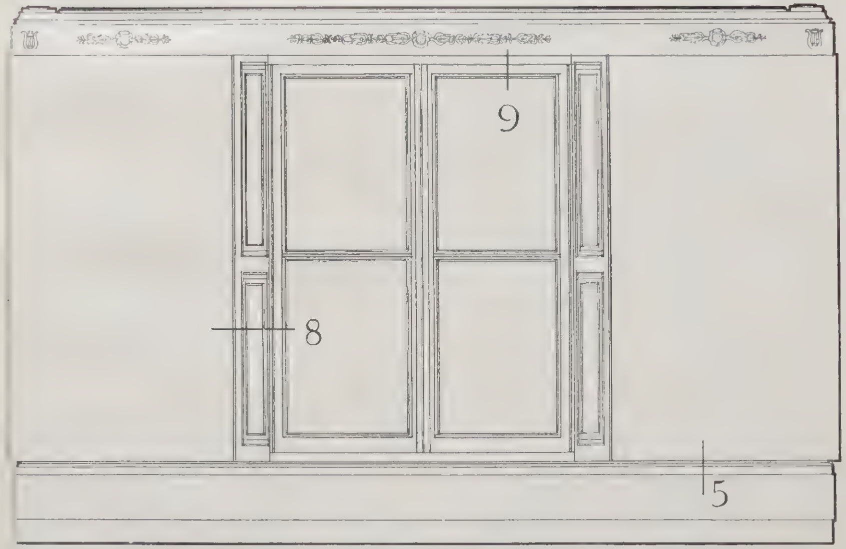
SOUTH ELEVATION



WEST ELEVATION

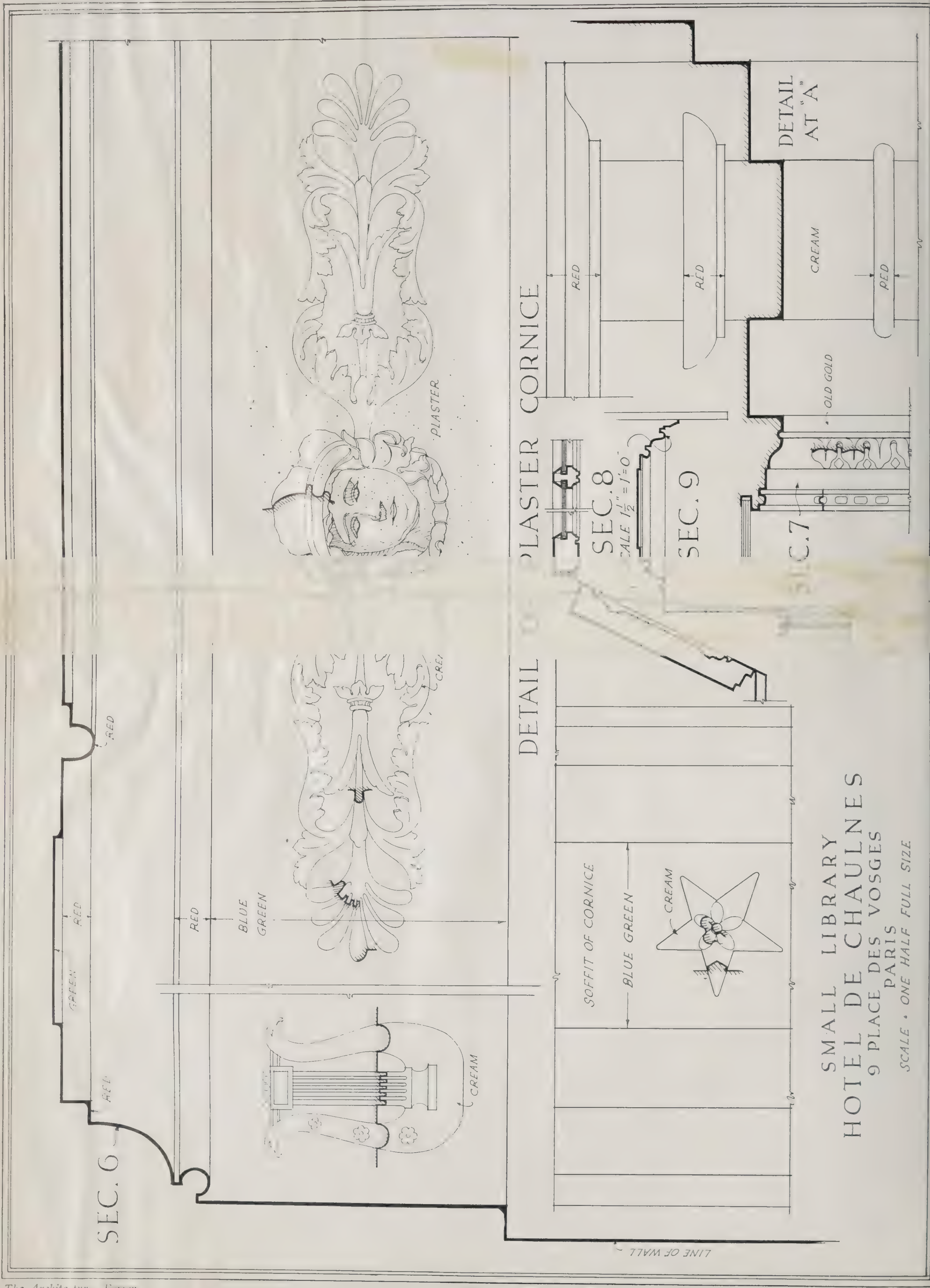


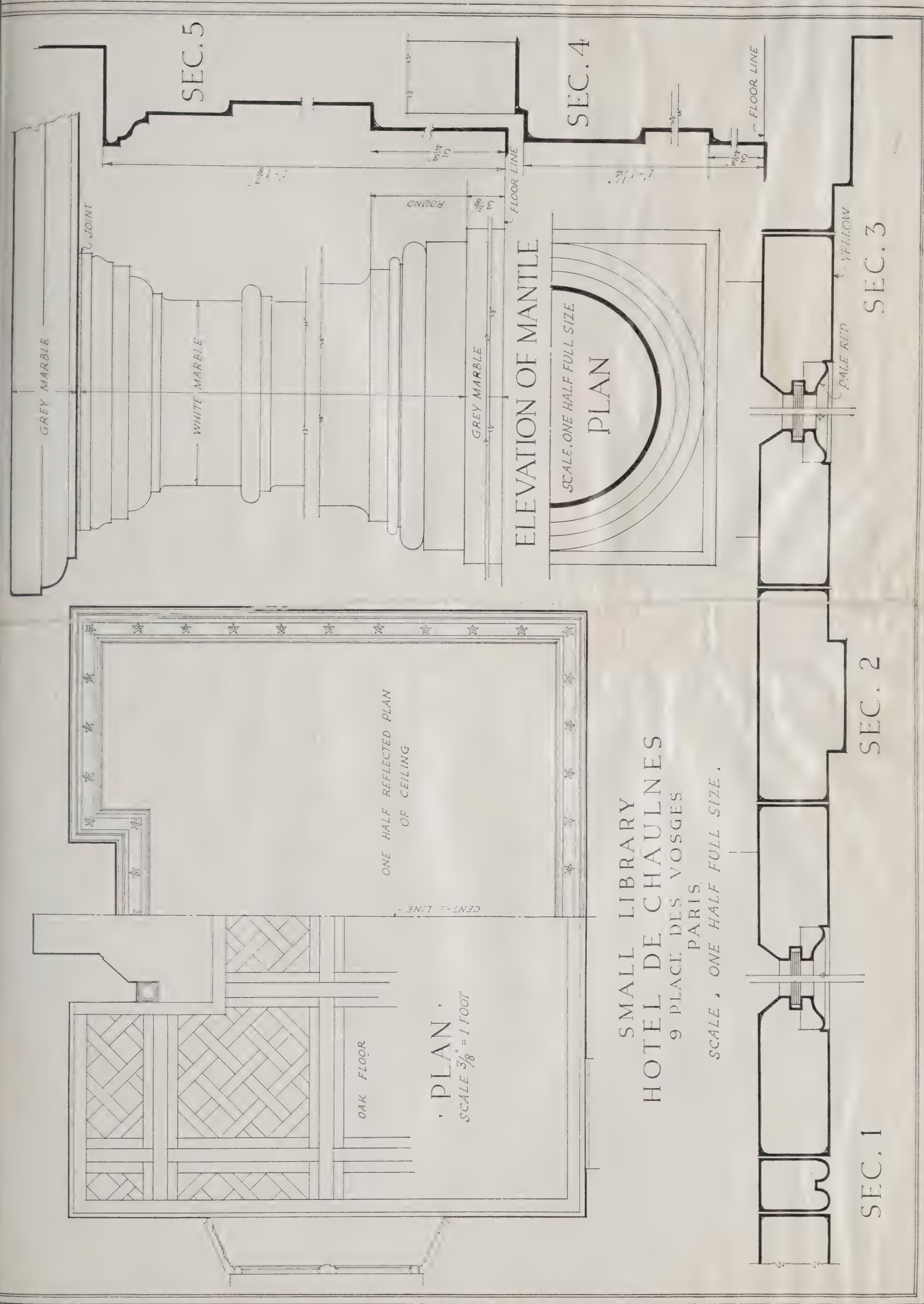
NORTH ELEVATION



EAST ELEVATION

SMALL ARY
HOTEL DE ULNES
9 PLACE D S SGES
PA
SCALE 3/8" FOOT





SMALL LIBRARY
HOTEL DE CHAULNES
9 PLACE DES VOSGES
PARIS
SCALE, ONE HALF FULL SIZE.

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# THE ARCHITECTURAL FORUM

## JUNE 1924

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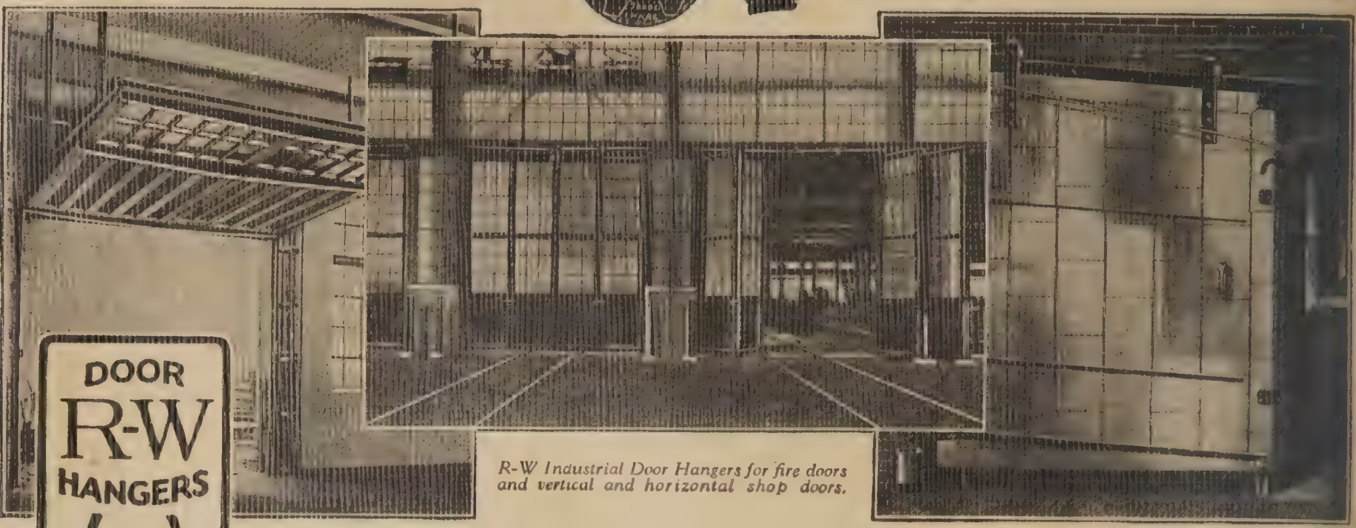

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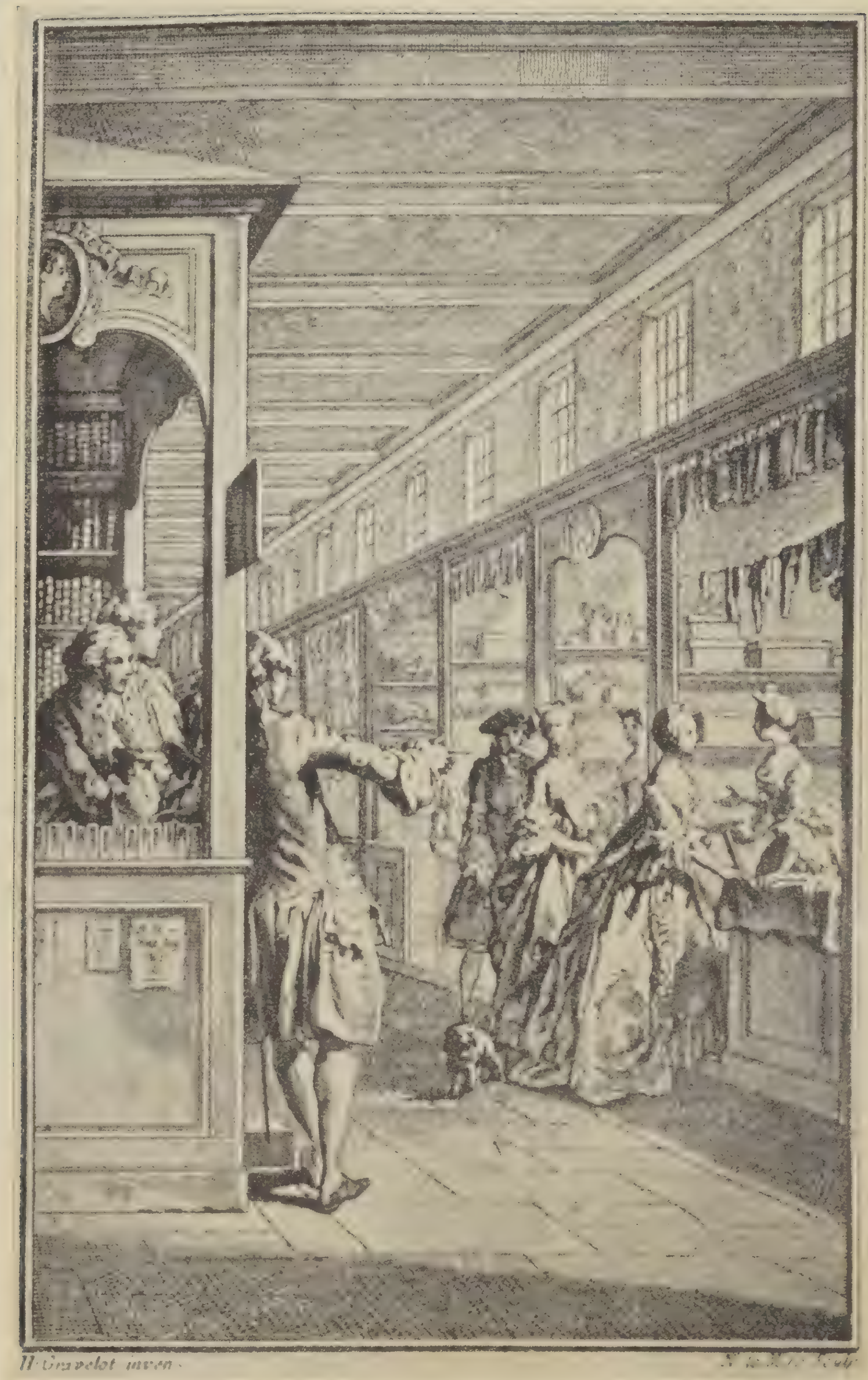

H. Gravelot inven.

LA GALERIE DU PALAIS
(FROM THEATRE DE P. CORNEILLE, 1764)

Engraved by N. Le Mire After H. Gravelot

The
ARCHITECTURAL
FORUM

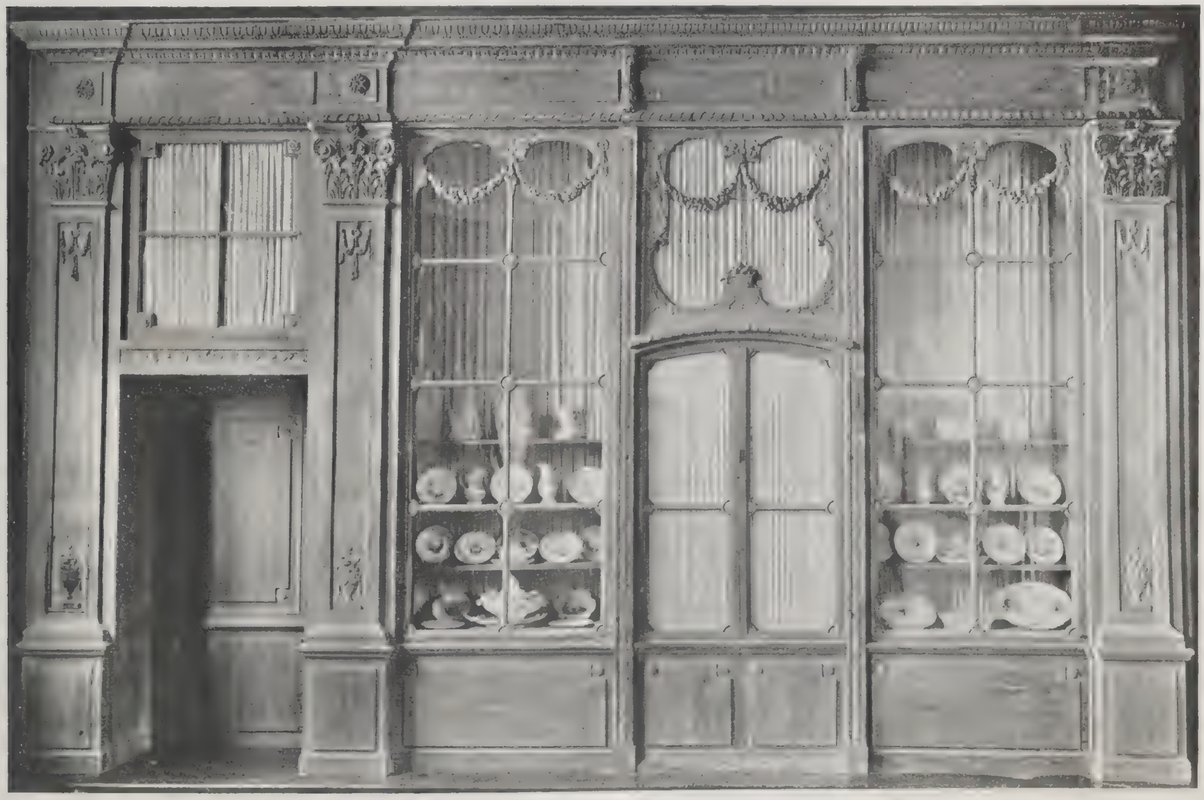
VOLUME XL JUNE 1924 NUMBER 6

# The Architecture of Retail Stores

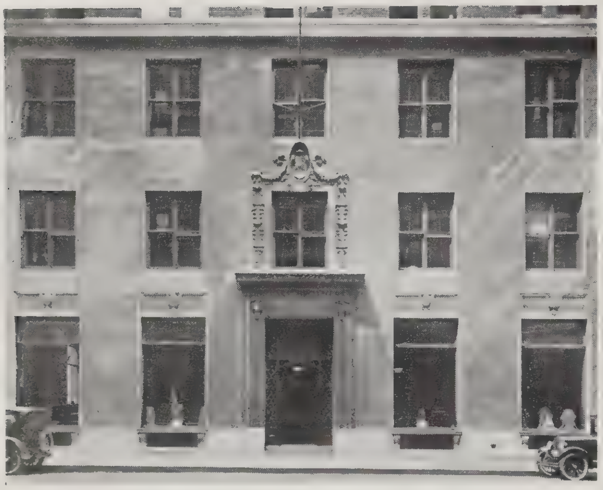
By WILLIAM LAWRENCE BOTTOMLEY

EVERY great city which is not merely a commercial center possesses some characteristic in a particularly marked degree. New York's chief characteristic is entirely its own, for there is no city in the world in which life is so driving. This is expressed by the constant struggle which goes on to keep pace with the thought and tendencies of the entire world, and the effort which the struggle costs is reflected in the sleepless, restless crowds and in the unsatisfied, incomplete, overstrained exertions of one city to rival the energy, intelligence and accomplishment of all countries.

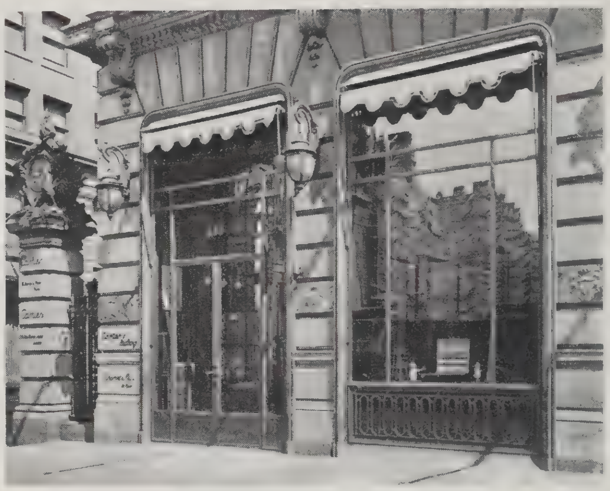
New York, indeed, viewed in one aspect, suggests a World's Fair—one of those vast enterprises, international in scope, where there is presented a survey of the progress of the race and the achievements which have been reached in all the arts and sciences. Many great cities of the world exhibit the varied industries and myriad interests which one associates with a World's Fair. New York, like a World's Fair, expresses the idea of infinite and boundless energy, but resembles it less than London or Paris, for New York was never essentially a manufacturing city, but a port, a Mecca, a city of extremes, that must be understood to be appreciated; yet the port turned itself into a market for the valuable industries it created. The actual building of the city itself has made a vast market for labor; the development of the decorative arts has formed another; but the practical and æsthetic adornment of the city's millions, their homes and their places of amusement and instruction, has been by far the greatest inspira-



A Parisian Shop Front of the Period of Louis XVI



Shop Windows, Brooks Brothers, New York

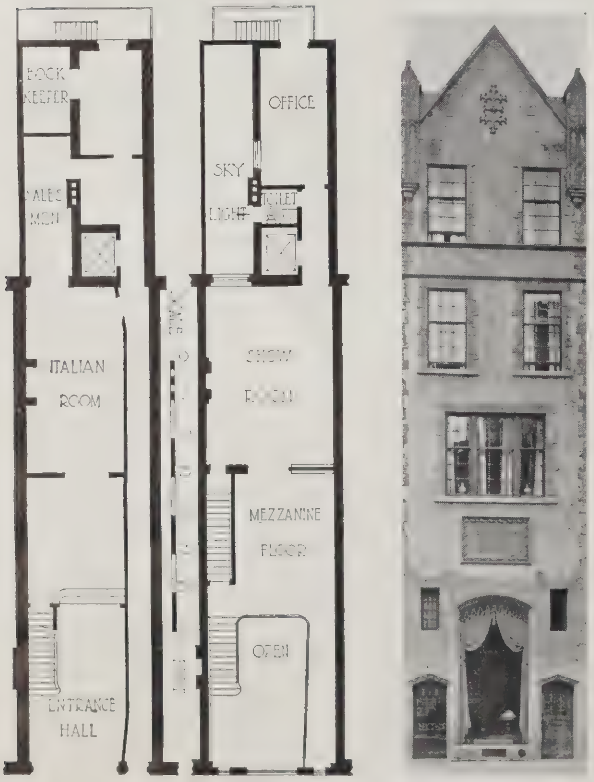


Cartier's, Fifth Avenue, New York

tion for its architectural and artistic development.

A certain portion of New York between the Pennsylvania Station and Central Park, rapidly centering nearer the park, is becoming a veritable World's Fair. Upper Fifth Avenue, Fifty-seventh Street, and to a certain degree the adjoining streets and avenues, present to the eye of the passer-by an endless variety of everything the human heart can desire from a lollipop to an Egyptian carving of the XVIII Dynasty. From examples of the whole range of art to the most fleeting whim of personal adornment is perhaps a wide range, but not too wide for our World's Fair, to which New York has been likened.

The problem of how to best show these wares to the public has not been well solved on the whole, and if one considers the matter from a broad point of view, there are but few examples to be seen that offer a perfect solution. It would seem patent to the most average mind that the show window of a shop should attract attention to the wares it contains. First of all, as one passes along the street, the building with its principal focus near the sidewalk should arrest the eye and create a feeling of interest and then a sense of attraction. It has been said that any advertising is good advertising, and that wide but unfavorable publicity is far better than none. It is



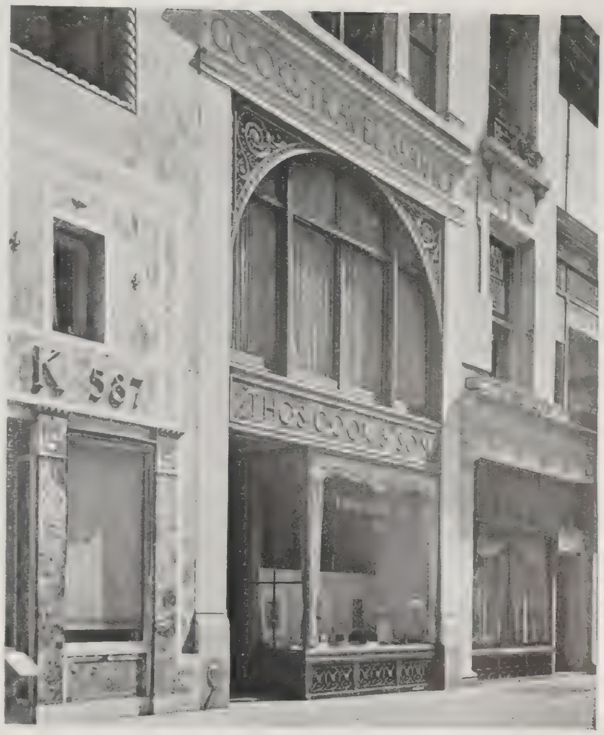
Floor Plans and View of Exterior, Shop of Barton, Price & Willson, Inc.

Fifth Avenue, 56th to 57th Streets
Duveen's at the Left

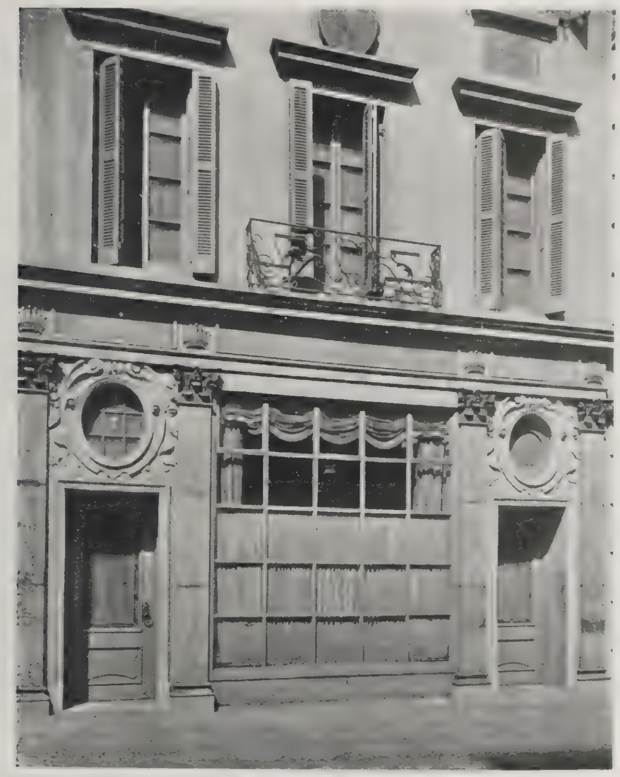
not proposed to either defend or attack this point of view, but it is self-evident that wide and favorable publicity is the ideal to be sought after.

The store front proper, as a next requisite, should so frame in the window display that it forms a becoming setting, definitely separating the composition in the window from its surroundings, harmonizing with its contents and cutting it away from any disturbing or competing forms and from any possible adjoining incongruities. The original framing of an Italian primitive or the bold decorative frames of a Spanish painting of the period of Velasquez illustrate this point to perfection. Seen at a distance, either arrests attention by the interesting outline and bold treatment of its color. Both are intrinsically beautiful, strong and command attention. They definitely separate their pictures from all others that surround them and, most important, they harmonize with them in scale, design and color. The same thing might be said of the beautiful gilt frames of the period of Louis XV which have been much used ever since they were invented, but which have been perhaps too much used, and so badly copied that they are now stale and commonplace, and for that reason fail to attract any attention or even to be noticed at all, the result of centuries of unwise use.

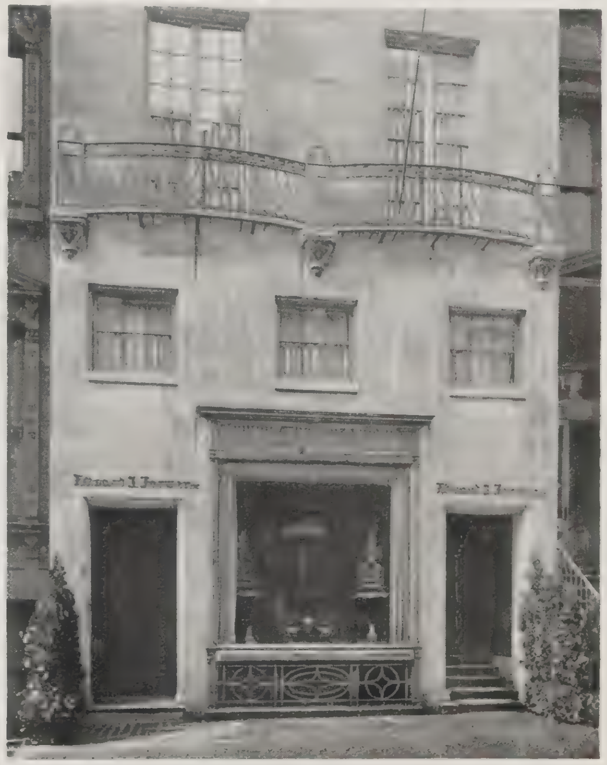
The framing of the show window should answer these requirements, but in addition should have its proper relation to the entire building, from both a structural and decorative point of view, and it is at this point that most of the designs fail. It is here that the design of the windows of Brooks Brothers (page 234) is so saliently successful. It is a conservative shop with an established trade. It does not cater to the mere passer-by. The windows are well proportioned, simple and admirably related to the upper part of the building, and while large enough to contain adequate displays, they are so reserved in size, in relation to the whole building,



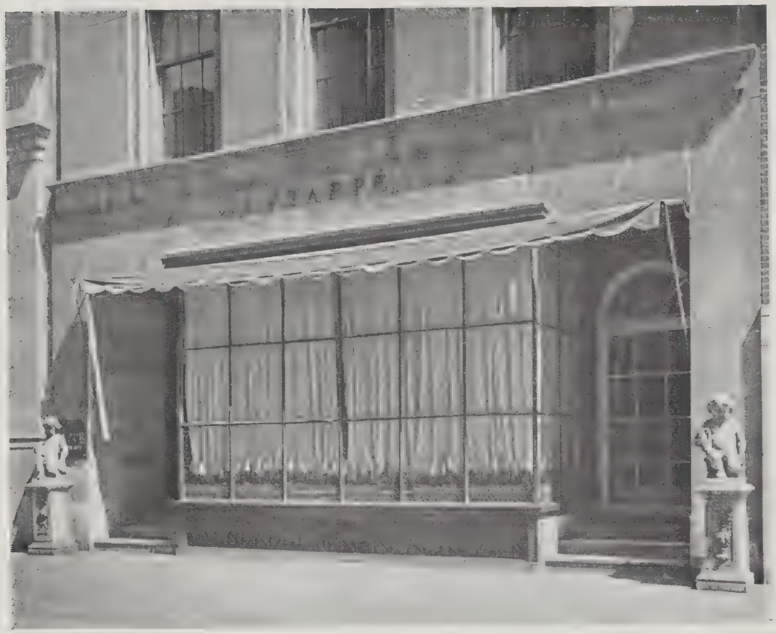
Maximum Window Area in Narrow Front
Montague Flagg, C. F. Rosborg, Architects



Facade at 6 East 56th Street
W. L. Bottomley, Architect; A. P. Hess, Associated



16 East 56th Street, New York
Trowbridge & Ackerman, Architects



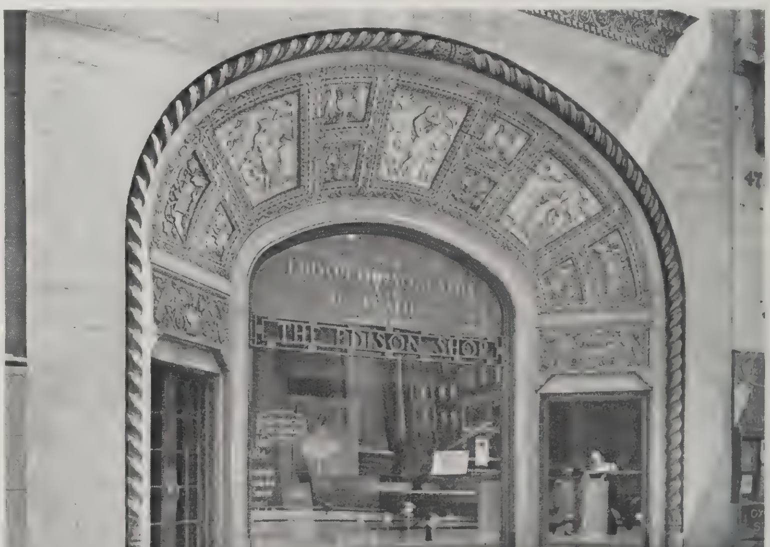
Excellent as to Scale; Admirable in Design
Kenneth M. Murchison, Architect

that they give an impression of distinction, restraint and aloofness well calculated to express the traditions of the establishment, now so long upheld.

The windows of Cartier's jewelry store (page 234) are perfect in every respect except in the way they relate to the upper part of the building. It always gives one a shock to see the clash in scale and design between the classic and rather Italian palace type of the old house in the upper stories and the beautiful, delicate and decidedly French treatment of the lower story. The windows proper are very interesting with a frame of bronze and verde antique marble. The plate glass, which is certainly the most practical material for a shop window, is divided in such an unusual way that the commerciality of the material is entirely lost while the delicate scale and choice materials form a setting for a display of jewelry or bibelots which it would be hard to surpass.

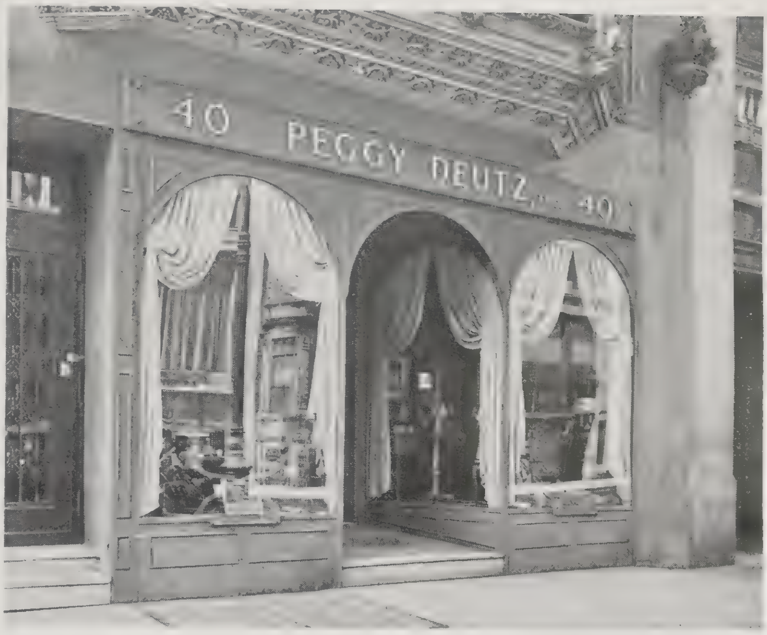
Another consideration which should enter into the study of the design of a store is the relation of the style of the building to the merchandise which it sells. Of course the question of historic styles has been greatly overemphasized in this country, and not enough good work is being done in our own idiom, but there are certain cases, as for example, that of Cartier's, to mention that excellent piece of work again, where on account of the renown of its headquarters in Paris it was appropriate to give it a distinctly French flavor. The show window of the shop of Elsie Cobb Wilson, Inc., on East Fifty-seventh Street (Plate 91), which was very cleverly adapted by Mrs. Wilson herself from an old English shop front, is essentially American and Colonial in its effect, and while it is very quiet in color and restrained in line, it is one of the most interesting pieces of design that one knows of. The delicate wood arches, the pilasters, friezes and cornices, the complicated but beautiful design of the muntins are very closely akin to the decorator's art and further express in their delicate detail the charm and distinction of Mrs. Wilson's own work. The whole shop front has been painted a dark bottle green so that one has to be very alert to notice it at all, but when once seen it is well worth careful study. The arrangement of the show window and the entrance to the building and the first story shop are handled in a most able way, which is truly satisfying.

Since Fifty-seventh Street bids fair to be the most fashionable and popular shopping street in town it is quite natural that many of the best shops are found there, and as the proprietors of these shops give more time and thought to their setting and surroundings, it follows that most of the well designed stores are found on that street. Barton, Price & Willson, Inc. (page 234), a firm of decorators have done over a whole building after the designs by J. P. Weir. The scheme is simple in its essentials and quiet in effect, as all good design should be, but it is very original in its plan and a decided departure from the conventional thing in its detail. The shop occupies the first two floors of the building and is arranged so that the front part extends



A Striking Use of Ornament in Relief
Shape & Bready, Architects

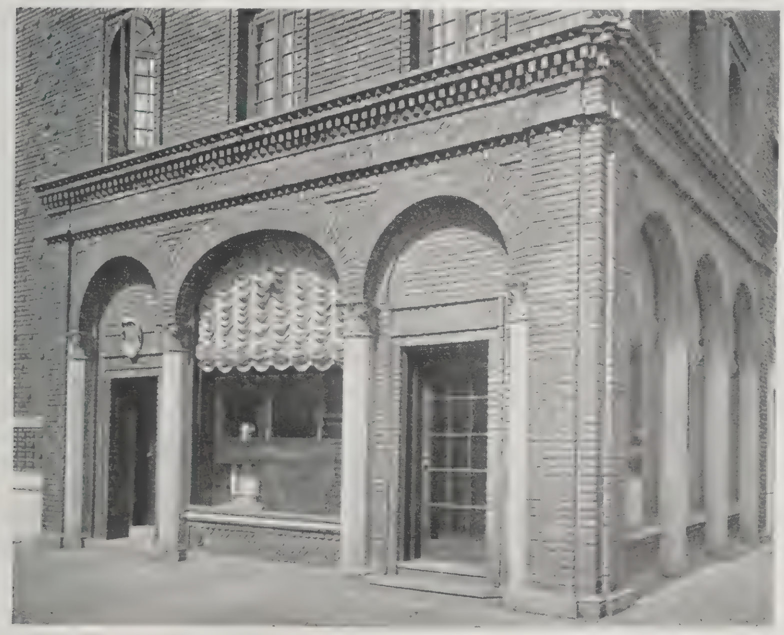
up through the entire height of these floors for a distance of about 25 or 30 feet from the street. The show window, which finishes in a pointed arch, also extends up almost as high, and this throws a flood of light back into the showroom and at the same time provides a very dramatic and becoming lighting for all the objects inside. It will be noticed from the plan that the main entrance to the building passes under a balcony on the west side and back to the stairs and elevator in the middle portion of the building. The rear and both sides of the shop have a generous mezzanine balcony which forms a very picturesque feature of the interior with its delicate stairway and wrought iron railings. The store front proper, the whole facade of the building and the interior of the showrooms are carried out in a very harmonious way. The style is picturesque with a certain Gothic feeling that is at the same time free and modern and yet full of the robust romance of the old Gothic work. The color is restrained to a wide range of values in gray and varies from a buff through beige to a cool stone gray. The walls of the interior have been given an antique plaster finish which forms an excellent background for the works of decorative art displayed against them. From many points of view this is one of the most interesting retail shops that has been done in New York.



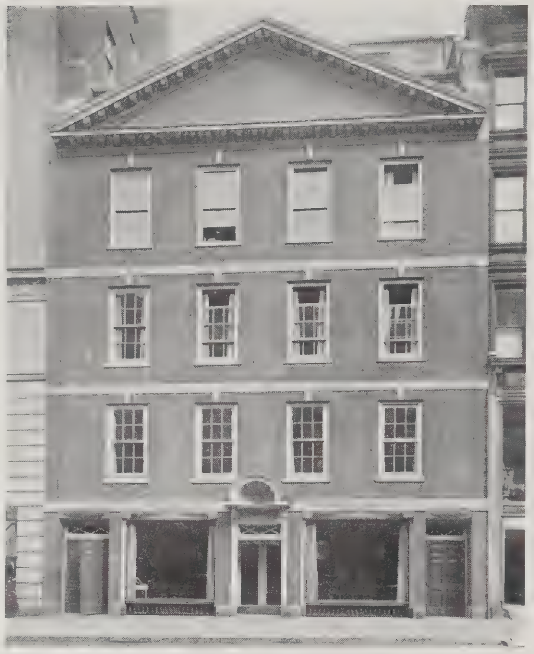
An Effective Use of Simple Architectural Treatment
The Utmost in Show Window Area

Another type of store that is diametrically opposite in its object and conception is being seen with increasing frequency. It has been developed from the need of large show window space in a limited front. The type is illustrated by the Avedon arcade at Fifth Avenue near 39th Street (Plate 84) which was done by Harry Allan Jacobs, who is said to have been the first to use this arcade plan in New York, and by the store of the Fain Knitting Mills near 42nd Street on Fifth Avenue, and a number of others. Here the center of the front opens through a short passage with show windows at either side into a circular or octagonal vestibule, also entirely surrounded by show windows and frequently with a show case in the center of this space, and the door to the shop opposite ends the short passage. The construction of all these windows and show cases is of the lightest possible, bars of metal holding the glass together, and with carefully placed displays lighted from above by colored "floods" and from the front and bottom by theatrical "strip" lights, the effect is at the same time attractive and inviting. The scheme is so original and so perfectly adapted to its ends that it is bound to come into far more general use. Among many advantages it makes possible an arrangement and a number of show windows, before the store is itself entered, which, if located on the street facade of the building would require a frontage many times the footage used for the arcade plan of entrance. Other advantages derived from this new plan are the comfort and convenience of the shoppers, who can examine articles displayed.

Architecture is the most conservative of all the arts. It requires a far

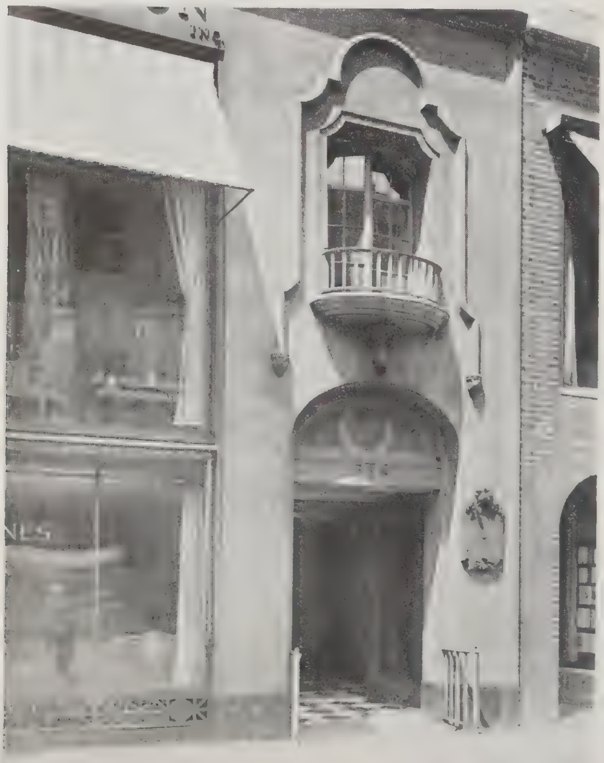


Excellent Use of Unusual Opportunities
Arthur Loomis Harmon, Architect

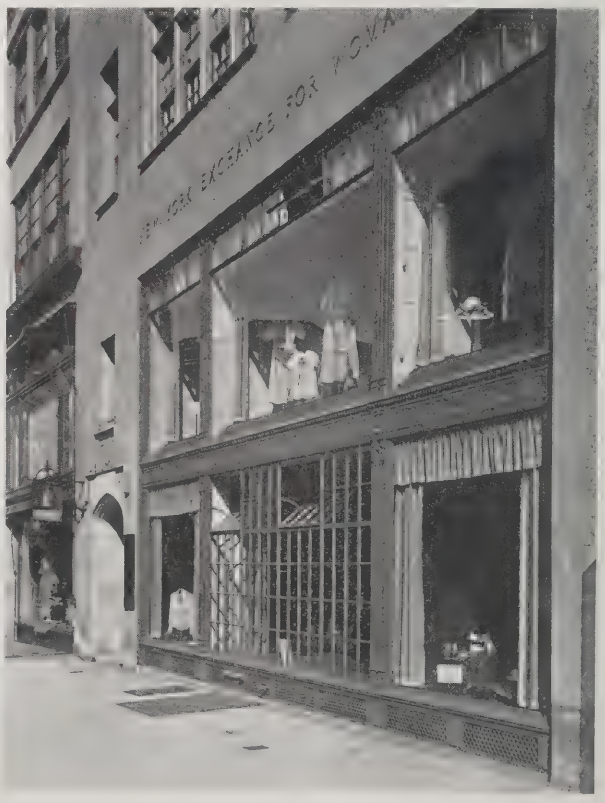


Shop of Madison Avenue Antiquarians
G. V. Smith, Architect

greater physical effort to produce a building than a picture, on account of the limitations of construction. The types of building change far more slowly in the development of design, than does style in painting and sculpture. The illustration shown here of an old Paris shop front built in the period of Louis XVI exhibits the contrast and at the same time the similarity of the work that we are doing today. This particular design is one of the most beautiful examples of a style which reflects the classic tradition, the careful balance and studied scale and proportion so characteristic of that time. The front, which is entirely of wood and glass, is in the Metropolitan Museum and forms a part of a collection brought to this country by the late J. Pierpont Morgan. The show window is framed in by Corinthian pilasters, modified as all classic detail was modified by the taste of that time. The scale is small, the carving is crisp and beautifully executed, and a certain restraint amounting almost to primness is felt throughout the work. Large panes of glass were not made at that time, so that of necessity the show window was divided into small panes held together by well moulded muntins. The design of the door and the transom, is, however, the most unusual part of the design and gives character and accent to the whole composition. It is bold but light, and while quite different in feeling from the rest of the work it still harmonizes with it perfectly. How fortunate it is that it has been preserved intact! Who in making a restoration of these motifs would have thought of doing them in this way? This small shop front executed in perishable material makes one pause to wonder if in decorative design we have advanced so very far in the last 150 years! As we still go back to such precedents as this French shop front, and to equally charming English examples, to design a shop front possessing refinement in scale and detail, it would truly seem that after all we are still very dependent.



Excellent Show Windows on Two Floors
Frederick Mathesius, Architect



Value of Small Panes Demonstrated
Butler & Rodman, Architects

# Stores in The Spanish Style

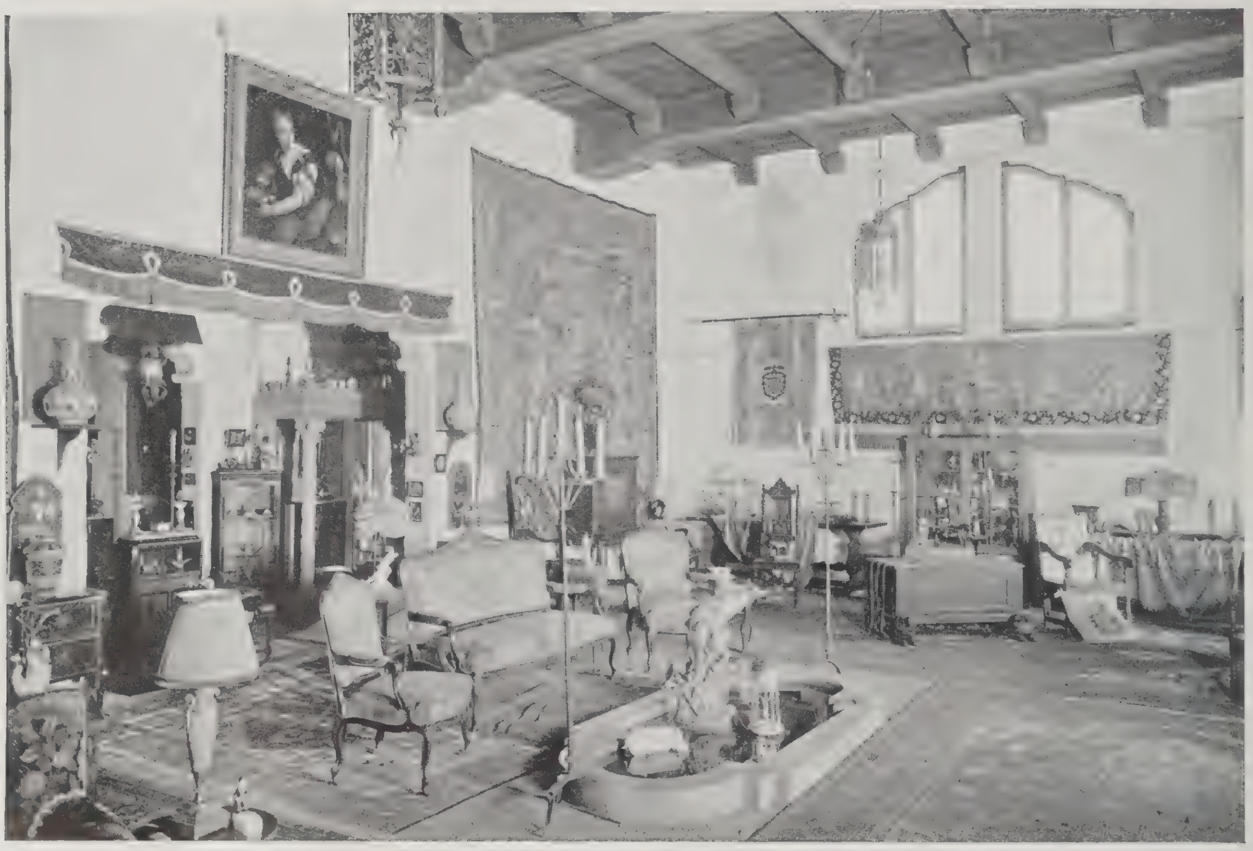
## ILLUSTRATING MODERN TYPES OF RECENT CALIFORNIA WORK

MORGAN, WALLS & CLEMENTS, ARCHITECTS

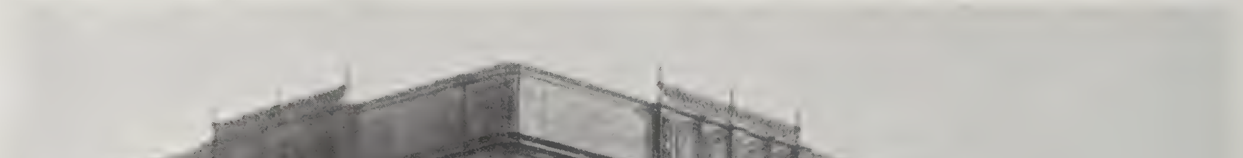
BUSINESS men long ago agreed that it is part of good merchandising methods to create for the exhibition and sale of their wares an environment or setting in which the merchandise would be presented to the prospective purchaser in its most attractive form. Evidences of the widespread prevalence of this attitude upon the part of merchants and shopkeepers are the increased attention which is being given to the character of their window displays, the thought and care with which the show windows themselves are designed, and in many instances the installation, at considerable cost, of special exhibition rooms in which merchandise may be arranged in ways which enhance its value in the purchasers' eyes and facilitate the sale of the wares exhibited.

The business world, moreover, now regards at its proper value the architectural character of the buildings in which business is conducted, and at its behest architects have drawn freely and heavily upon the store of architectural precedent which past centuries have bequeathed, with results which are always interesting and frequently successful from the viewpoints of the architects themselves and of the merchants who are their clients. Where the results have not been successful, the reason is often to be found in the fact that choice was not wisely made among the variety of types of architecture and decoration which exist, or that the adaptation of a type has been made with little regard to its being appropriate or to the needs of the locality where the shop is situated. Only too often have architects persuaded their clients (or else have been coerced by them) into use of the stereotyped "bronze front" precedent which now prevails almost everywhere, to the neglect perhaps of other types which by reason of their particular suitability or by their association with the locality would be especially attractive to patrons, and which by appealing to their good taste and sense of the fitness of things would assist in the sale of merchandise, which after all is the chief aim of the shopkeeper. A merchant who evidently believes in having his business premises planned and designed by an architect rather than by a mail order house is said to have remarked recently that "good architecture in everyday commercial work was not only a splendid investment but actually dropped dollars into the owner's pockets"—from which it would appear that at one and the same time the amenities of architecture were duly observed and the God of Commerce served.

The early Spanish Renaissance type of architecture possesses a number of advantages which have brought about its wide use upon the Pacific coast and particularly in southern California, a region with which it is historically identified. It is a type which offers many advantages which render it particularly appropriate for shop buildings of certain kinds, and California architects who have been quick in recognizing these advantages have in a number of instances created notable shop building groups. The style is used with particular success where structures are low in height and where there are wall spaces sufficiently ample to afford the contrast be-



TIMBERED CEILING AND WALLS OF TEXTURED PLASTER AS BACKGROUND FOR FURNITURE



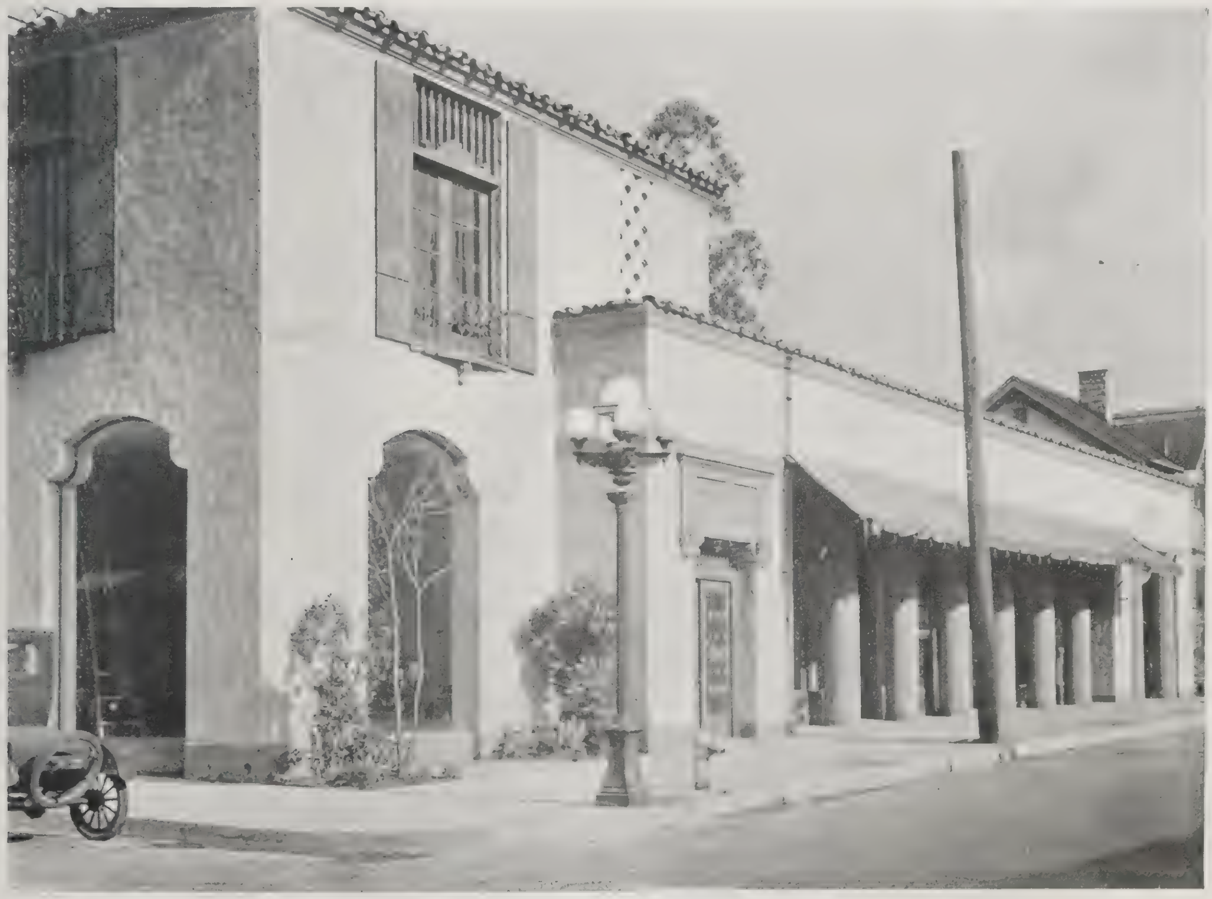
ONE OF A GROUP OF BUILDINGS IN SPANISH STYLE IN LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS

Candy Shop, Westlake Park District, Los Angeles

Millinery Shop, Hitt Building, Los Angeles

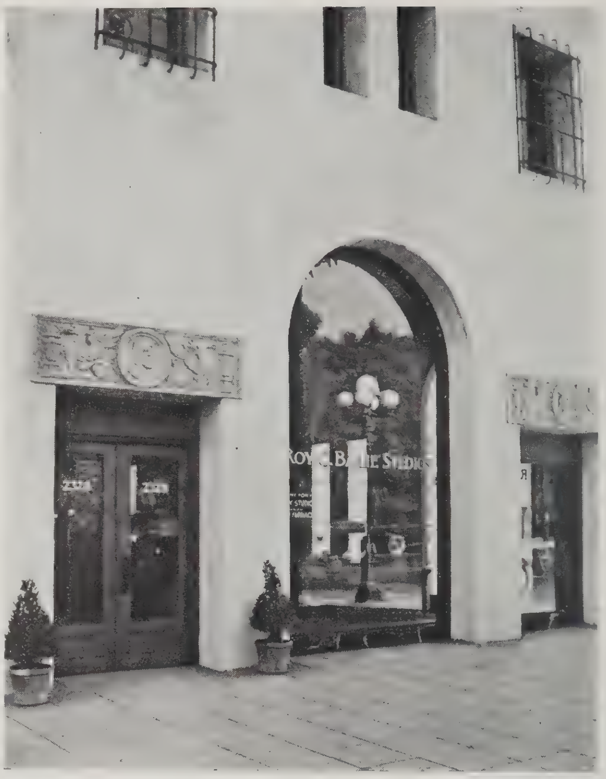
tween plain stucco walls and the small areas of more or less elaborate ornament in relief which are used with such telling effect in panels and friezes or about certain windows and entrance doorways. Windows are frequently massed in groups. Opportunities for the use of ornament in other forms are not lacking, for ironwork is used in guards placed in balcony fashion at windows or in the grilles which often cover entire window areas, while color is used in soffits of different kinds, for the ceilings of vestibules which are practically loggias, upon shutters or blinds, and sometimes for painting directly on the walls themselves, stenciling on the stucco surfaces.

The characteristics which render the Spanish Renaissance type so appropriate for exteriors of shop buildings are equally useful in arranging their interiors. The grouping of windows which is so effective from without is quite as successful within, and the broad, unbroken spaces of wall which afford opportunity for the effective use of exterior ornament are useful for arranging wall cases and shelving in shops of certain types or for the hanging of

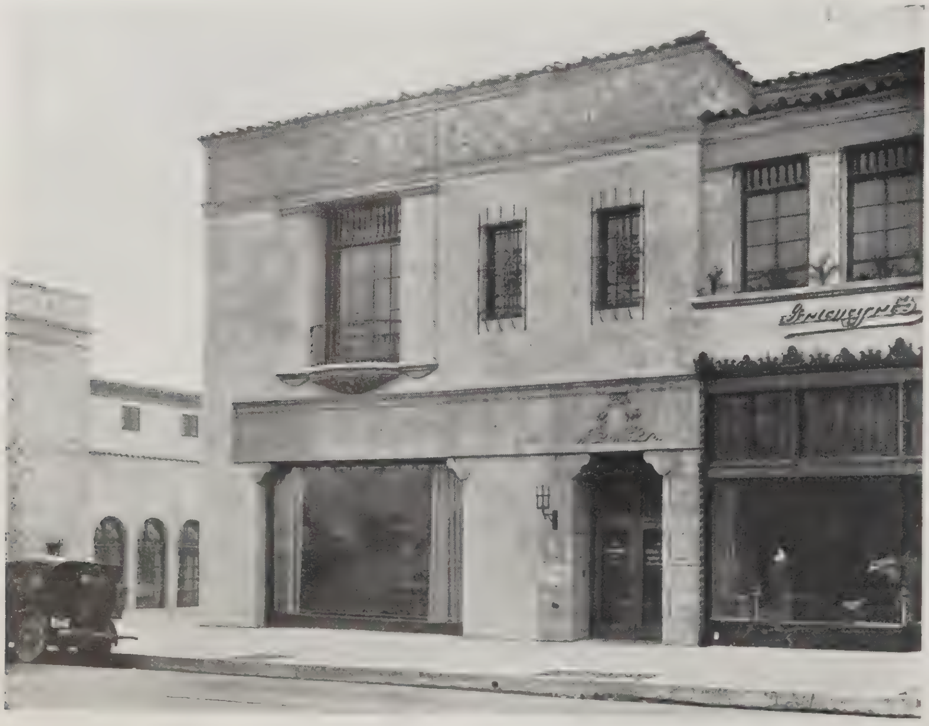


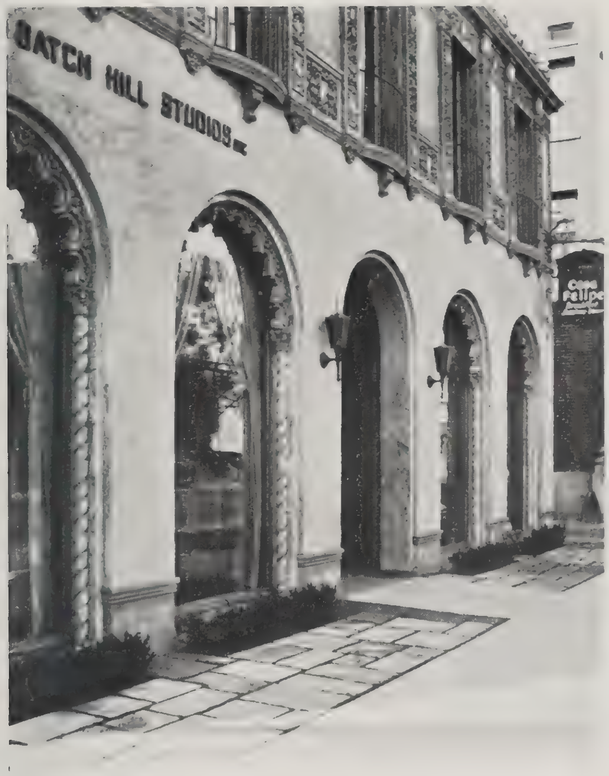
Hitt Building. Small Shop Buildings in Spanish Style Offer Opportunities for Beautiful Grouping tapestries and paintings or for the arrangement of furniture in shops of some other kinds. So flexible is the type that it may be given a treatment which is highly ornate or severely simple, the aim being, as it should always be in planning a shop interior, to create a tasteful and attractive setting for the merchandise to be sold or the service rendered therein. The use of the Spanish style also presents unusual opportunities for employing accessories and furnishings which add materially to the interest and beauty of their surroundings. Tiles may appropriately be used upon walls and floors, wrought iron in countless forms such as lighting fitments and the grilles or screens about cashiers' booths, while the actual furniture, such as show cases and counters, and tables and chairs where they are used, may be equally "Spanish" when severely simple or, where a more elaborate treatment is desired, decorated with painting in gold and colors.

The illustrations included in these pages show the exteriors and interiors of a number of shop buildings and individual shops in Los Angeles. The architects, Morgan, Walls & Clements, have been unusually successful in obtaining an insight into the spirit of the style, and the buildings are in full accord with the Renaissance of Spain, and yet they are thoroughly practical and well suited to the purpose for which they are intended. Utility has been clothed with a garb of beauty without sacrifice of anything which good business methods demand, and inasmuch as purchasers are, without always realizing it, drawn to shops which are attractive and interesting, the keepers of these shops possess a certain advantage in offering their wares or their services.


Walls of Stucco; Cast Stone Ornament; Thorpe Building, Los Angeles

The illustration at the top of page 239 shows a group of three shop buildings, that at the left being built for the Fifth and Broadway Investment Company, that in the center belonging to the Bilicke Estate, while at the right is the Thorpe Building. These three structures occupy corner plots with long frontages upon a prominent street and shorter frontages upon other streets, and they face a strip of parkway in which the edges of a lake are bordered with semi-tropical verdure. All the buildings have walls of brick coated with a rough, wavy-textured stucco, two buildings being a dark cream buff, while one is gray. In keeping with the Spanish style in which they have been designed, the buildings are low in height, partly but one story high, partly two, while a portion of the Thorpe Building is a rather narrow pavilion four stories in height. The structures are well grouped and composed, with low hip roofs covered with tile or with flat roofs surrounded with parapets which are themselves


Simple Fenestration, Giving Excellent Show Windows

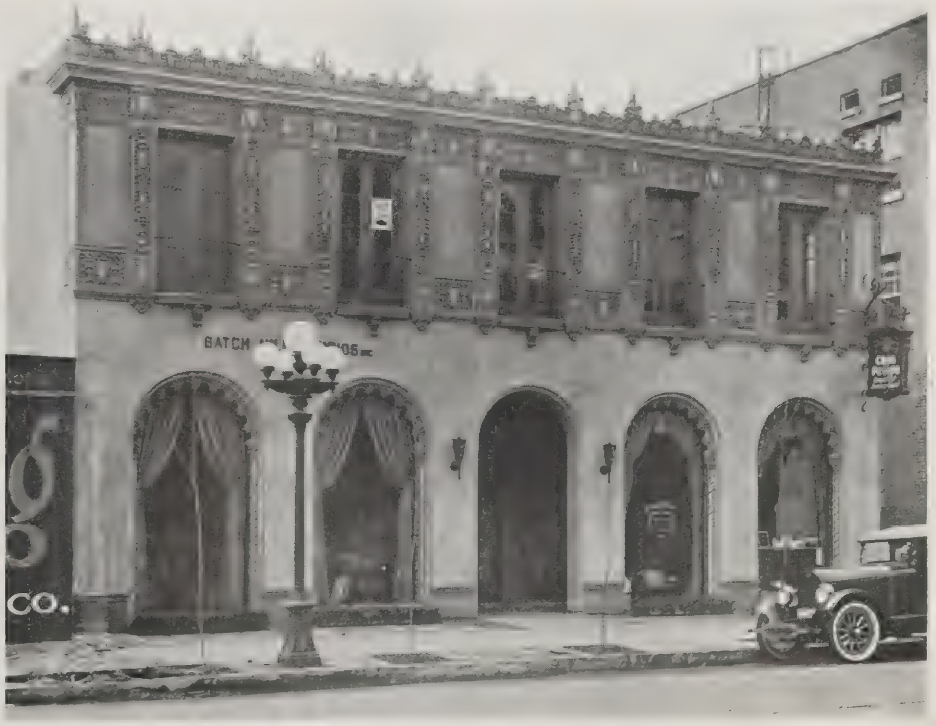


Polychromed, Antiqued, Cast Stone Ornament

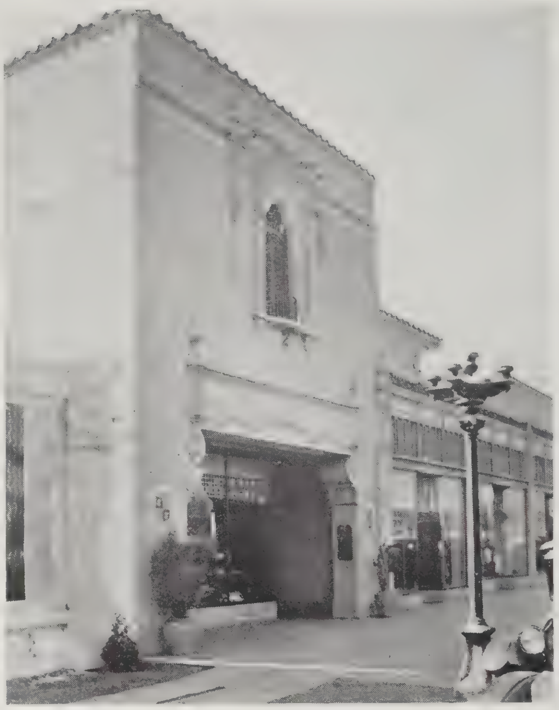
covered with tile. These roofing tile are of varied clay colors and are laid irregularly, doubled or tripled at the eaves, which gives an interesting shadow line on the wavy-textured wall surfaces. Windows of the upper stories of these buildings are attractively grouped and ornamented with plaster and cast stone decoration in high relief. Individual doorways and windows at the sidewalk level are treated in similar fashion, but where a number of shops are placed side by side, involving large areas of window and door space, the shop fronts have been treated as a single unit, their upper portions arranged as a continuous frieze and the entire composition drawn together by a uniform method of treatment. To prevent the marring of the appearance of the buildings by signs of many kinds, use has been made of the parapet above the shop facades for such signs as are necessary—not sign boards, but metal lettering of a nearly uniform style fixed directly upon the walls. One of the illustrations of these Los Angeles buildings shows the interior of the shop of an antiquarian or decorator and offers an idea of the value of walls of somewhat rough and appropriately toned textured plaster as background for tapestries, fabrics and paintings. The ceiling with its timbers visible adds materially to the Spanish character of the room by exposing the construction, and the grouped windows high above the floor at one end of the shop admit necessary light without unduly breaking up the wall surface, a show window here being impossible owing to the space outside being used for parking automobiles.

Also characteristically Spanish, though of a somewhat different appearance, is the McKinley Building. This structure is not built upon a corner plot but occupies space about 50 feet in width in the middle of a block. An absolutely symmetrical facade has been used, the arched entrance in the center giving access to the two ground floor shops as well as to the offices on the second floor. The large show windows to the right and left of the entrance carry the arched treatment across the lower story of the building, while above are balconied French windows, each surmounted by elaborate decoration, and all the windows are connected by panels of ornament to give the effect of a deep frieze across the facade. This ornament, which is of cast stone and is high relief, has been antiqued and decorated in colors and affords a rich contrast with the wall surface of plain stucco. Added contrast is given by the placing of the metal window guards in balcony fashion between the highly ornamented jambs of the second floor windows, all this giving strong, satisfying accent.

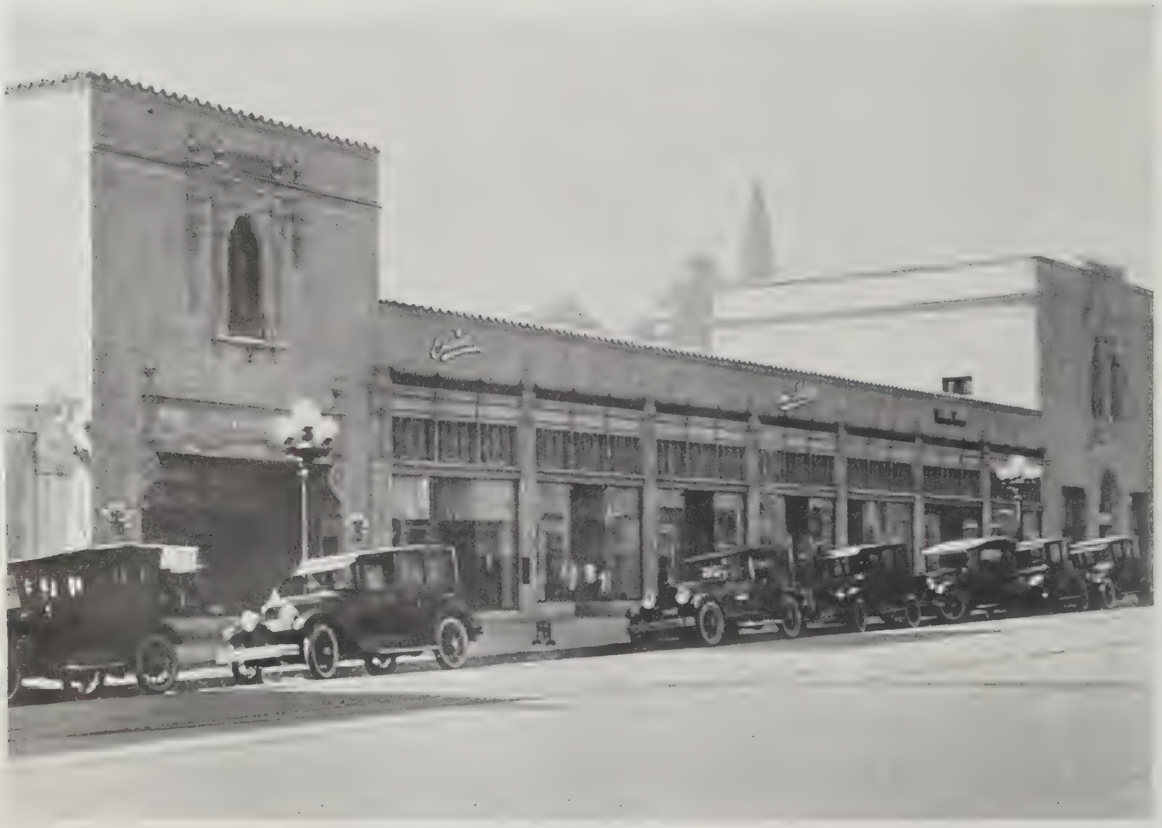
Of a still different order is the Hitt Building,



General View of McKinley Building, Los Angeles which again occupies a corner plot and consists of a row of one-story shops with a second story only at the corner proper. The long one-story portion has been handled very simply as a colonnade, the shop fronts being recessed within the row of columns which support the entablature. Here again the exterior walls have been covered with stucco which is hand-textured, the color being a soft gray with a suggestion of green. The two-story portion of the building is covered by the familiar Spanish low hipped tile roof, and the coping or parapet of the one-story portion is covered with the same tile. Cast stone has here again been used for panels above certain important doorways. At the corner the building has been recessed 4 feet behind the one-story portion, the small area thus formed being partly paved with flagstones and partly planted with shrubbery. Two large show windows at the corner of the ground floor have been given the bold Baroque outline which one sometimes sees in old Spanish buildings, and perhaps the crowning bit of ornament is found in the windows of the second story with their delicate bronze grilles arranged baluster fashion, elaborately wrought iron balconies or window guards, and polychromed wooden shutters. The entire exterior of the Hitt Building constitutes a study in color,—the polychromed shutters, the woodwork about doors and windows antiqued to a glazed moss gray, the metal tones of wrought iron, the tiles of roofs and parapet, and the striped awnings of the colonnade shops,—all this against the gray-green of the rough-textured stucco walls themselves.


Bold, Effective Use of Ornament

The architects of these Los Angeles shop buildings were fortunate in the fact that the structures are placed so closely together that they form a group or a series of groups, for the structures are not so disposed among other buildings of greater heights and of nondescript character that they are obliged to compete with them upon manifestly unequal terms.


One of a Group of Shop Buildings, Westlake Park District, Los Angeles

# Essential Details in Store Designing

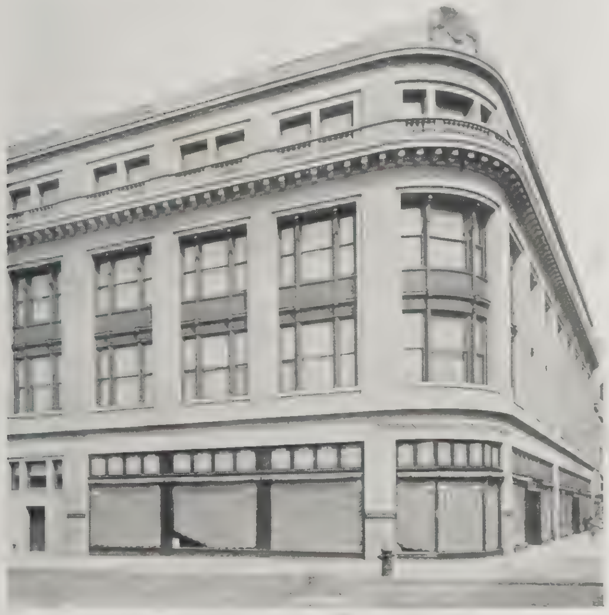
*By* ELY JACQUES KAHN

IN planning any store the type of establishment, the location and the desired effect are the determining factors that must guide the designer. It is also essential to bear in mind the fact that the purpose of the store is not only to display merchandise but to enhance its sales value, so that practical requirements must be considered in the design of the display cases or counters. An equally serious consideration is that most store owners are particular about the cost of their work and dislike unwarranted experiments in design that may prove unexpectedly and unreasonably expensive. It is fortunate that in recent years a clear recognition has developed of the actual value of a beautiful store, since the main difference between the attractive and the unattractive result lies in the direction that an intelligent designer can give to the work, and the cost is likely to be approximately the same. Let the solution be practical, and the owner will be interested in seeing a new arrangement of his goods in an attractive setting.

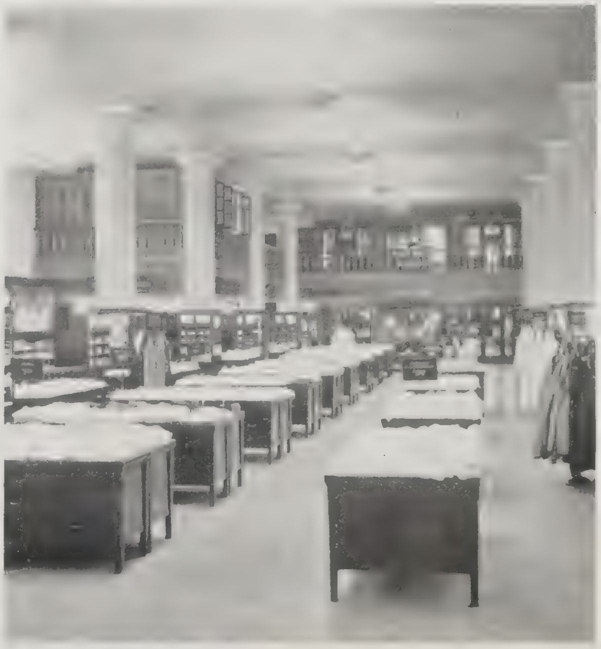
Inasmuch as the theory of the successful store is first to interest the customer by means of the show window, it may be pertinent to analyze a few characteristics of this portion of the shop exterior. An automobile salesman wants cars shown on the street level. Furniture display windows require the lowest elevation from the street. Dresses should be shown in the normal relation of the customer's eye to the model on which the dress hangs. Jewelry and similar small articles must be nearer the eye and not dwarfed by the scale of a large window setting. The design of the show window proper is not only dependent on the height of its floor but also on its depth. This dimension is also determined by the character of the merchandise and has been standardized to quite an extent. Furniture, for example, requires a depth of approximately 12 feet, in which a reasonably interesting exhibit can be made. Department stores find 8 feet satisfactory for general display purposes. It is evident that where small articles are to be placed the shallow window with high floor is to be preferred. In the illustration of the Oppenheim Collins & Co. store in Brooklyn the arrangement and proportion of the show windows can easily be seen. Note that the floors of these windows on account of the type of goods to be displayed are almost on the sidewalk level. The design for this retail store shows a typical solution of the problem of securing scale in store facades. Had it been commercially expedient to carry down through the show windows the stone piers of the second and third stories of the design, a more perfect combination of architecture and commercial requirements would have been attained. The illustration of the interior of the main floor of the Oppenheim Collins & Co. store indicates the care taken by this firm in the arrangement of its show cases and counters.

It is interesting to note that the merchandising theory of an establishment has another important influence in the shop window design. A store specializing in low priced articles for popular consumption shows in its windows a great quantity of goods and little architecture, while the higher priced shop will carefully display a few well chosen objects.

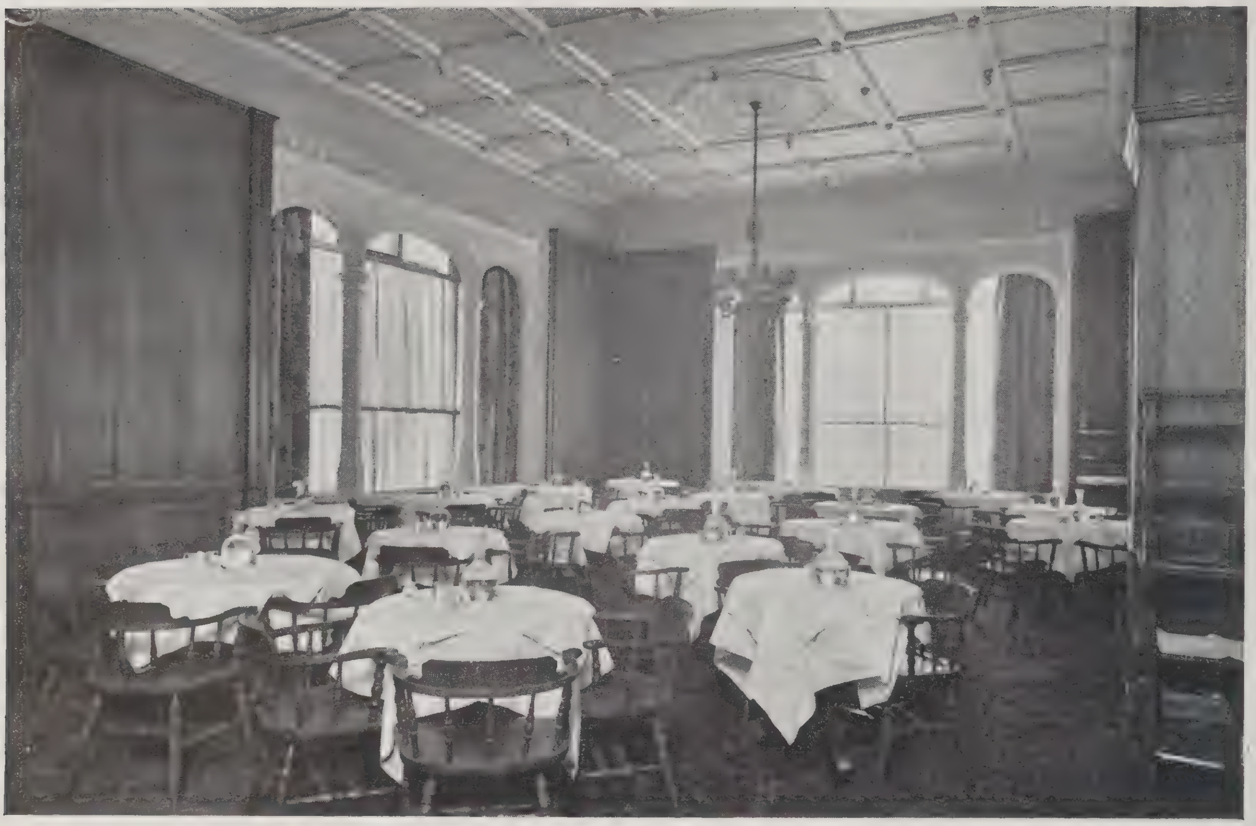
In the lighting of the show window, which is of



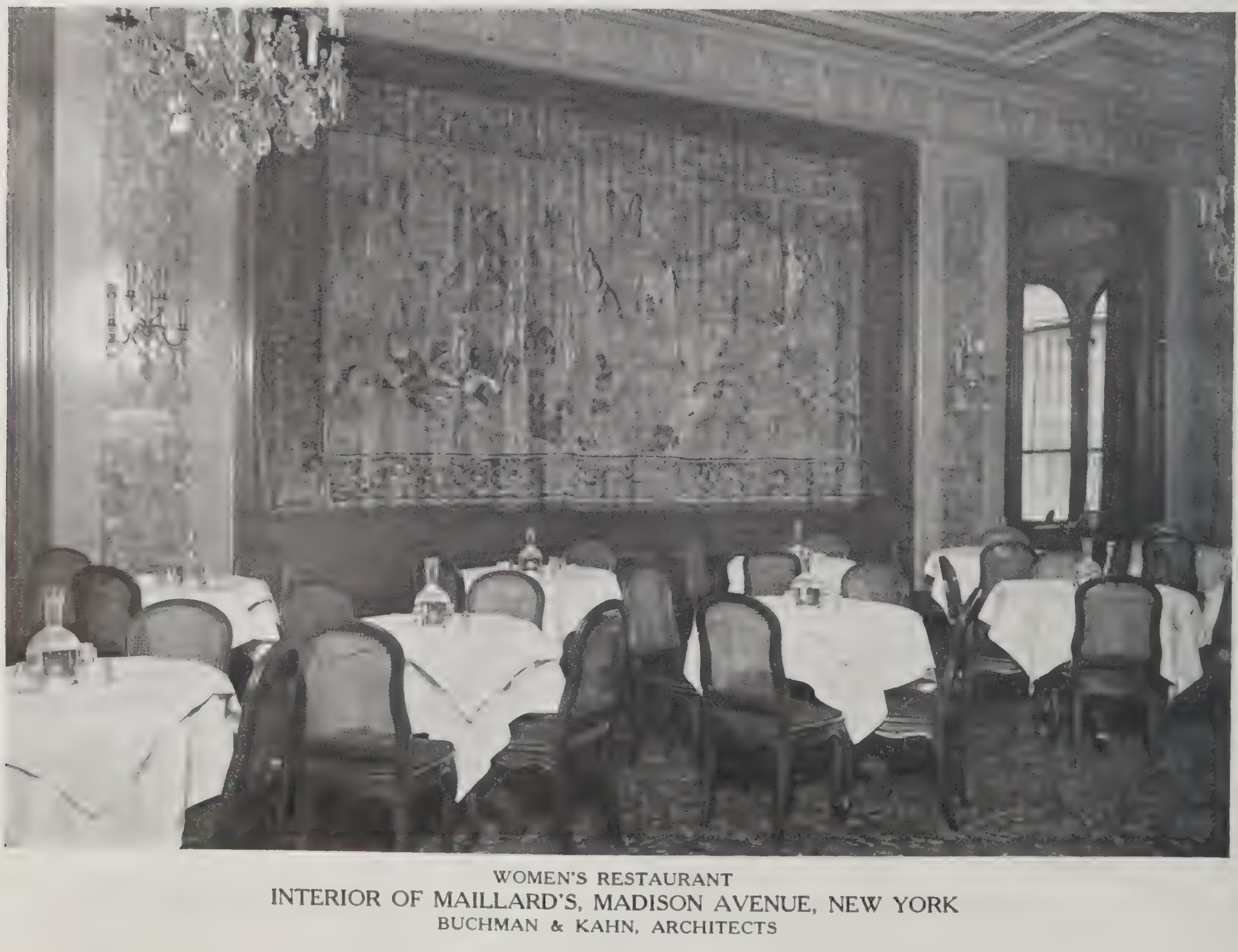
Exterior of a Women's Shop



Main Floor from Entrance



THE MEN'S CAFE



WOMEN'S RESTAURANT

INTERIOR OF MAILLARD'S, MADISON AVENUE, NEW YORK

BUCHMAN & KAHN, ARCHITECTS

great importance, the intensity and color of light are adjusted to the sizes and types of windows. The use of reflectors built in the cabinet work eliminates glare, and the judicious placing of spotlights gives most interesting variations of light and shade in successive displays. Since the intensity of light will be affected by the color of the show window's walls, it is important to determine first the main effect desired, remembering the character of the merchandise. Dresses, for instance, should not compete with their background. Furniture will look best against a neutral tone that will contrast with the richer color of the wood. It is a matter of experience that the orientation of the store on the street bears an important relation to the color of the interior of the window because the glare of light caused by the reflection of buildings in the vicinity can produce difficulties in obtaining a satisfactory window effect.

The doors to the store are among the details that worry the architect as well as the owner. They must not be too heavy to be handled by a woman leading a child. There are possibilities of customers or children being caught by badly placed hardware or by swinging doors. It is always of extreme importance that everything in a store be foolproof—radiators, drinking fountains, elevators, everything that can come into contact with a careless customer, for if anything does happen, the store is responsible. It is for this reason that a firm like Oppenheim Collins & Co., in its stores throughout the country watches minutely the details of its buildings and constantly works to perfect the operation of its sales machinery.

Maillard's; Corner of Women's Restaurant

Maillard's; Entrance to Men's Cafe

In considering the interior arrangement of a particular store, the sales policy will direct whether it is advisable to hide merchandise in its setting or to show everything that can conveniently be laid out so as to tempt the customers. An excellent illustration of these different policies was evident in the arrangement of two large furniture establishments in New York. One specializing in high grade furniture had its floor space divided into rooms which were decorated in different materials and colors. In these rooms selected groups of furniture were carefully placed, surrounded by accessories that lent distinction to the pieces. The second institution built no partitions and showed great quantities of goods so as to impress the customer with an overwhelming assortment of furniture from which to make a selection. Both proprietors are convinced that they are right, and for their own classes of merchandise they are.

The care shown in interior arrangement is always instructive, even though the results are so simple that it is difficult to recognize their artistic merit. A store like that of Oppenheim Collins & Co. in Brooklyn is somewhat of a standard for its owners, in that apart from the general scheme, the details of show windows, floors, lighting and general utilities have proven sufficiently satisfactory to have become a standard to follow in their other buildings. The main floor is of marble, while the space back of the counters, for the comfort of the employes, is of wood. The lighting throughout is indirect, and the store fixtures are so designed and arranged that at short notice they can be rearranged and readjusted for special sale purposes or other unusual uses.

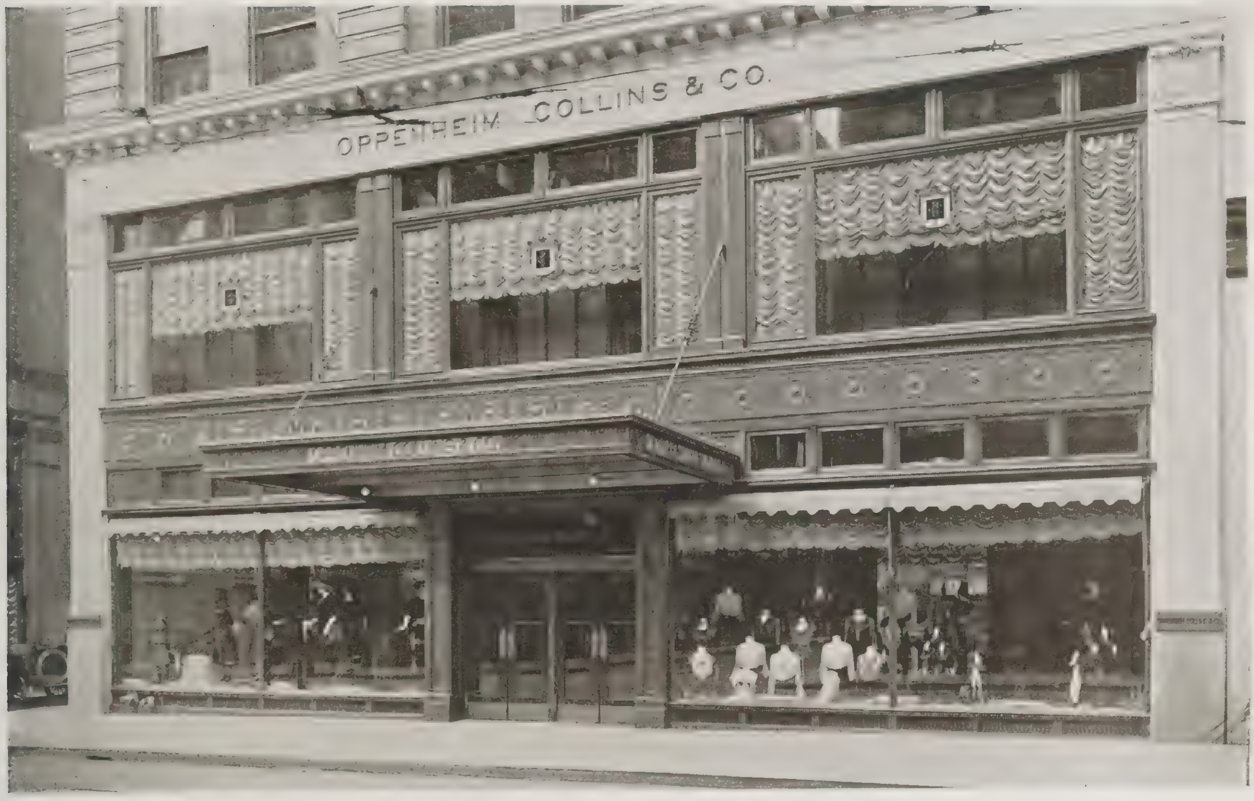
Sometimes a store, becoming an institution, takes itself seriously, and the designer has an unusual opportunity. The Maillard store in New York carries on an old tradition, which made it important to be conservative in the design and in the use of material, but the owners were willing to permit well known craftsmen to coöperate in the work. It is encouraging to discover that it is economically possible to bring excellent craftsmanship into a commercial undertaking so that it may gradually develop a condition when the artist will welcome further opportunity and the store owner see the advantage of such coöperation.

In the Maillard candy shop the counters have been kept close to the walls on either side in order to give adequate space as an approach or corridor to the women's restaurant which is directly back of the shop. The decorations of the entrance to this restaurant, although quite elaborate, form a transition from the simpler treatment of the shop itself to the richly decorated restaurant. An arcade treatment in three arches with finely detailed columns and pilasters forms this entrance, and repeats the arches used for the interior of the restaurant windows. Use of small arches was made in the windows and door openings to give a unity of scale to the entire interior decorative treatment. The walls of this room are divided by panels of two kinds of marble on which ornate lighting fixtures give a note of interest. The principal wall space is decorated with a large tapestry to add color and variety to the decorative treatment. Smaller interior wall panels are filled with arched mirrors to help repeat the general scale of the detail. From the heavily paneled ceiling are suspended elaborate crystal chandeliers to add both elegance and gaiety to the interior design. The floors are covered with heavy carpets in rich colors, and the furnishings are carried out in walnut in a simple manner after the style of Louis XV.

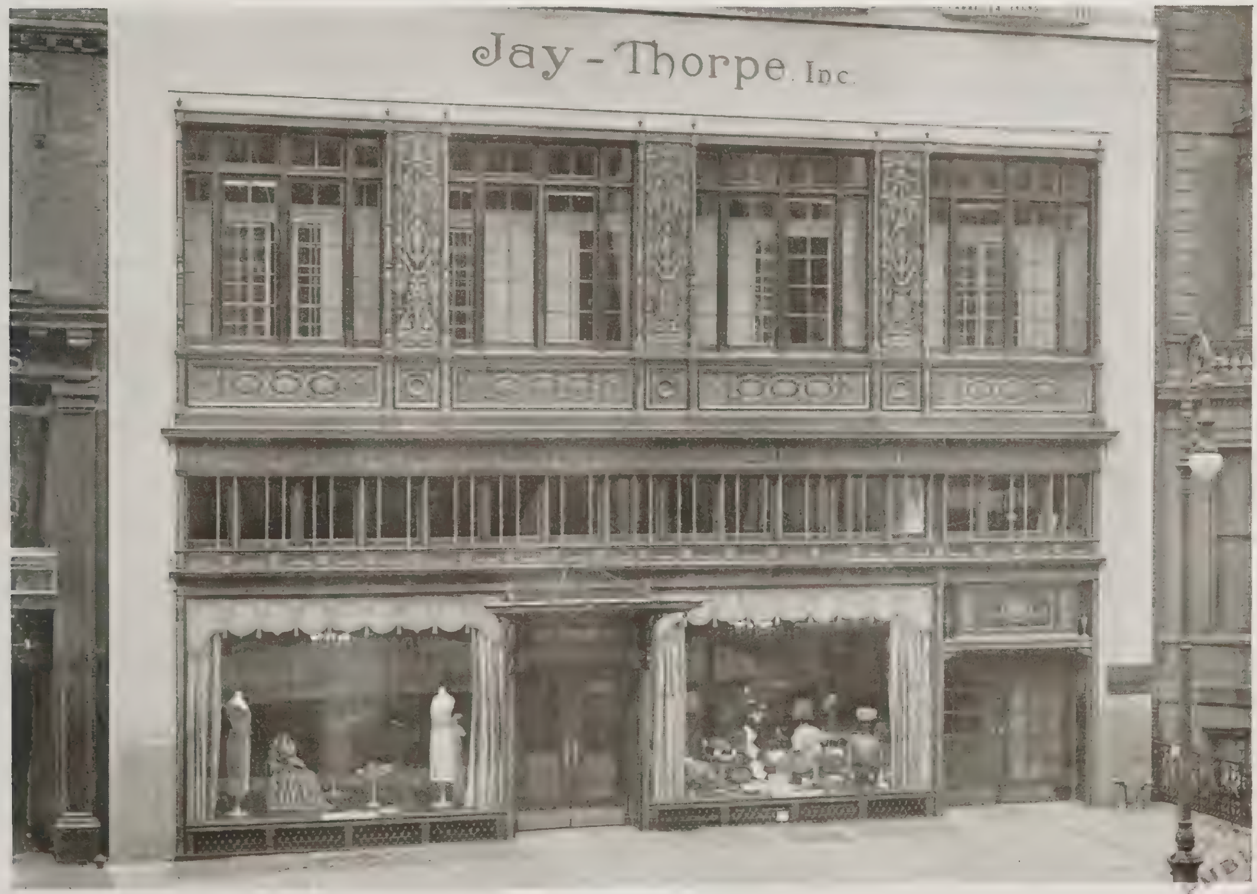
A further variation in design is introduced in the entrance from the women's restaurant to the men's cafe, at the rear of the building. This entrance consists of a three-part opening, a large arch in the center with vertical openings on either side, suggestive of the Palladian motif; heavily embroidered draperies which fill these openings give seclusion to the men's cafe beyond. In this cafe, which has been executed in a simple adaptation of the Elizabethan style, colonnettes and arches have again been introduced to give scale to the large window openings by reducing their apparent sizes. As these windows are the ordinary large glass openings of a typical loft building, all effort to change their scale and character had to be incorporated in the design of the interior. Not only does the arched treatment of the interior of the windows give scale to the design but also the oak paneled walls and the plaster cornices and ceiling mouldings. In this cafe the furnishings are carried out in oak in a solid English style appropriate for a men's cafe. As in the women's restaurant, heavy, deep toned carpets cover the floor.

One End of Candy Counter

Part of the Candy Shop



RETAIL STORE FRONT IN PITTSBURGH
BUCHMAN & KAHN, ARCHITECTS



FRONT OF A SPECIALTY SHOP IN NEW YORK
BUCHMAN & KAHN, ARCHITECTS

## OPPENHEIM COLLINS & CO. PITTSBURGH

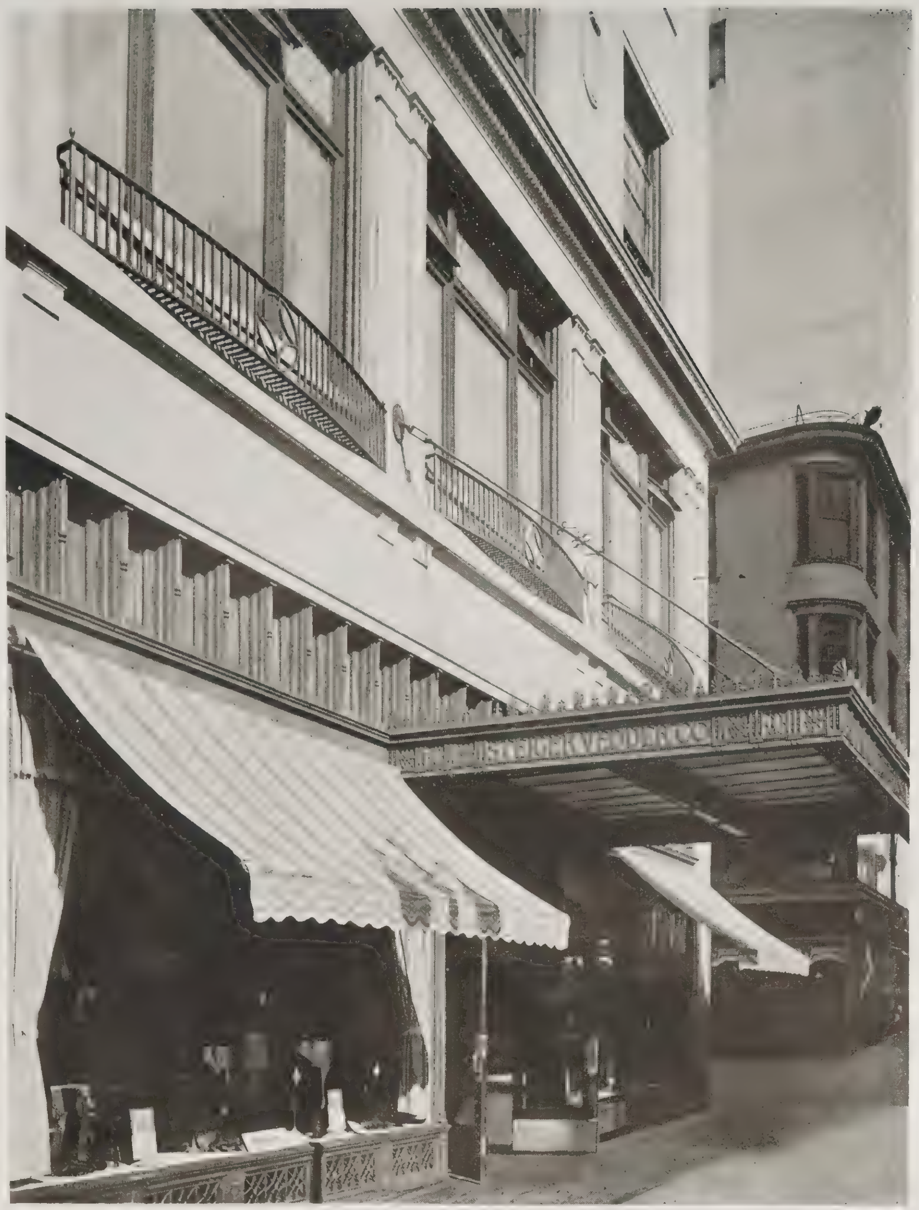
### Upper Illustration, Plate 81

Where a retail store has many branches it seems to have become the custom, no matter how numerous or where located those branches may be, to employ a uniform type of architectural design for the entrance facades. Undoubtedly this custom must have commercial value because often a different or simpler design might better suit the local conditions. Although this store of Oppenheim Collins & Co. happens to be located in Pittsburgh, it is almost identical in appearance with their store on West 34th Street, New York. As the design for a large individual store front in two stories, it is interesting as meeting commercial requirements and yet having architectural detail. No shopkeeper could ask for larger or better placed show windows, more ample entrance doors, or a more imposing canopy—which so well serves to display the name of the firm both up and down the street. The height of the show windows above the sidewalk has been carefully considered for the proper display of both large and small articles of merchandise.

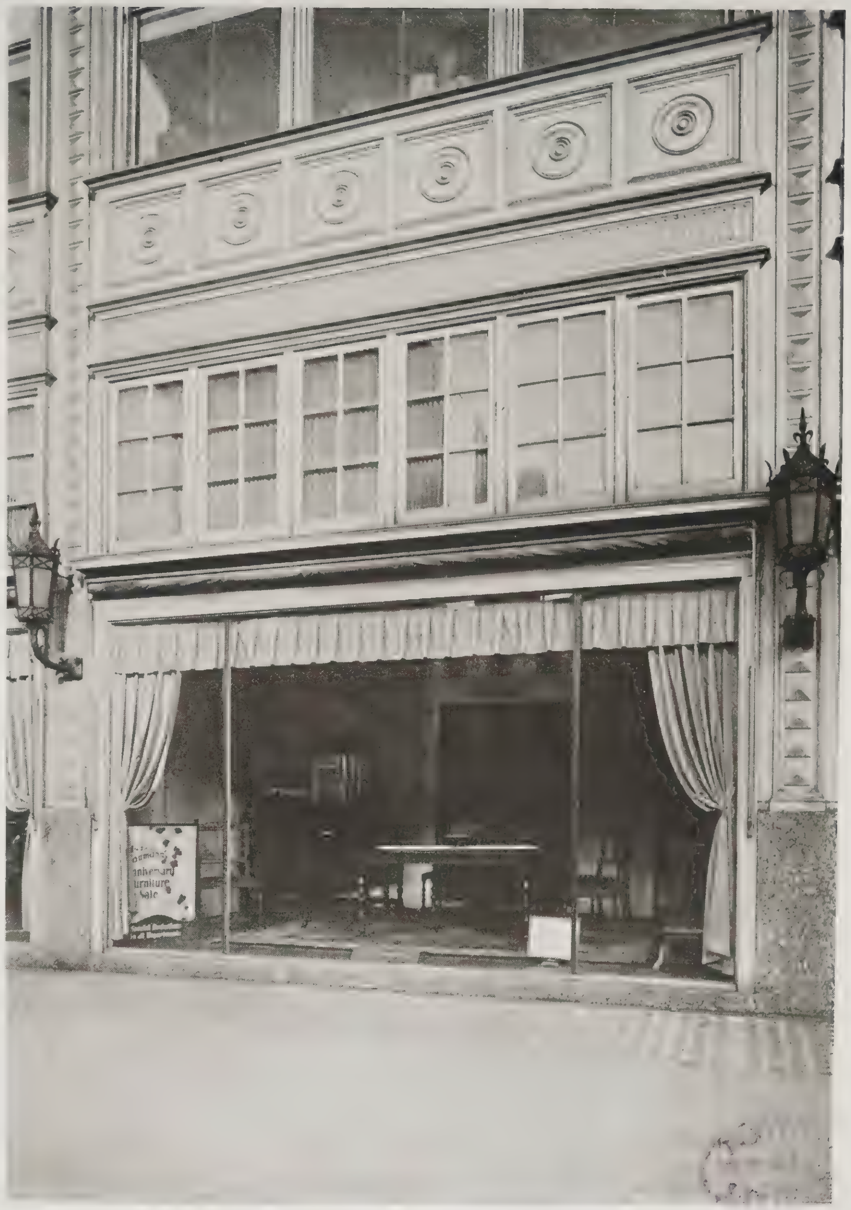
## JAY-THORPE, INC., NEW YORK

### Lower Illustration, Plate 81

Although enclosed in one large plain stone opening, the facade of the Jay-Thorpe, Inc. shop is really divided into two distinct parts. In the lower half are seen the entrance door and large show windows of the shop itself as well as the entrance to the elevators to the upper floors of the building. Above these essential street motifs is a long glass transom to light the store. The upper half of the design, on account of the use of the interior, which is fitted up for small display rooms, permitted the use of a much smaller scale of detail. Very ornate bronze panels and balusters surmounted by a delicate cornice surround the four windows which are given scale by the introduction of heavy mullions, transoms and muntins, dividing these openings into many panes of glass. The same well studied scale is carried out in the heavier cornice surmounting the lower half of the design, where slender balusters and small glass sashes continue the scale across the transom. As far as commercial requirements have permitted, the same refinement is observable in the details of the entrance door and windows.



DETAIL OF A RETAIL STORE IN HARTFORD
BUCHMAN & KAHN, ARCHITECTS



SHOW WINDOW FOR LUDWIG BAUMANN & CO., NEW YORK
BUCHMAN & KAHN, ARCHITECTS

## LUDWIG BAUMANN & CO.
## NEW YORK

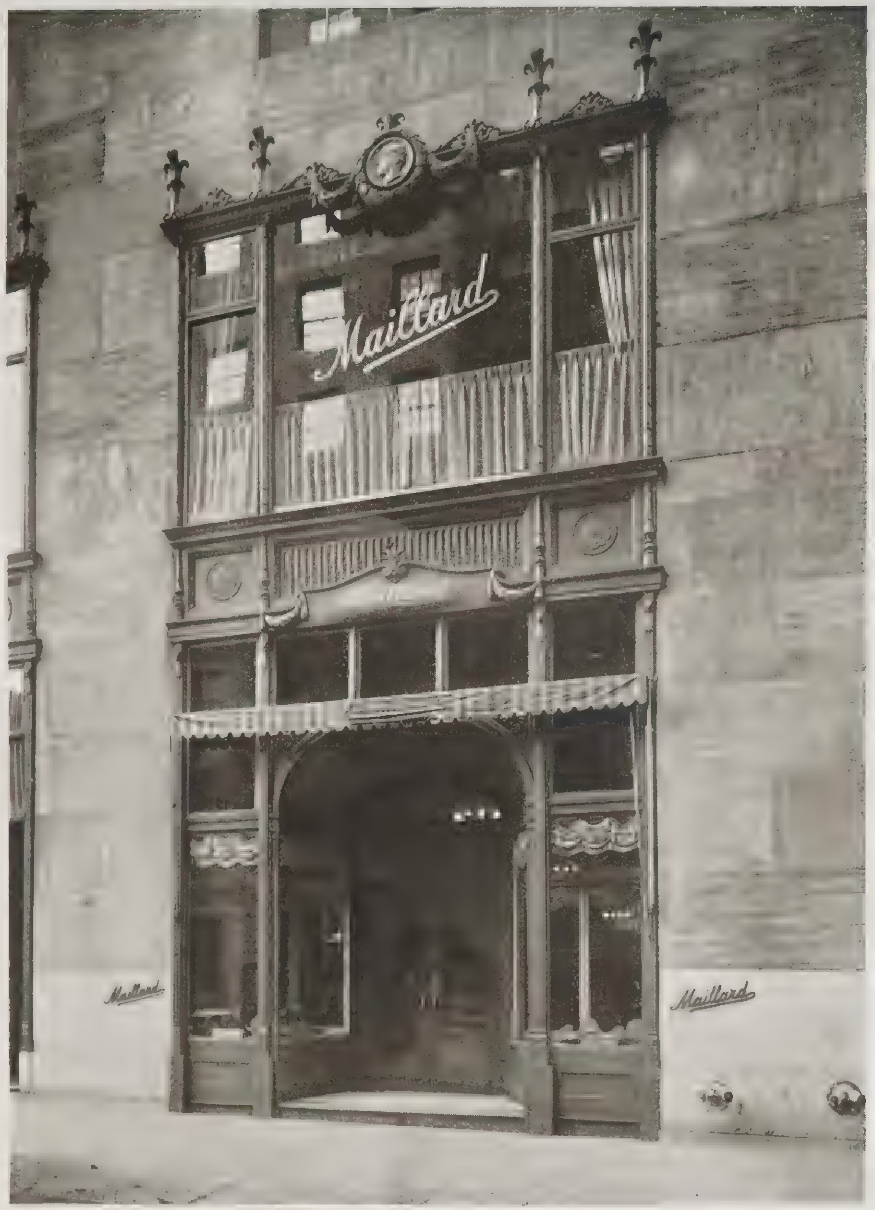
### Upper Illustration, Plate 82

This large, low show window which is designed for the display of furniture is one of a series of similar windows in the new building of Ludwig Baumann & Co. It is shown here as an excellent example of a typical commercial window. Although divided into three divisions, the window necessarily shows no scale but is distinctly the open end of an interior room, protected by glazing from the elements. Any architectural treatment of such an extensive hole in the wall is practically impossible. To indicate any support for the architectural treatment above, it seems preferable in this type of design to frankly show the steel girder which makes possible so spacious a show window.

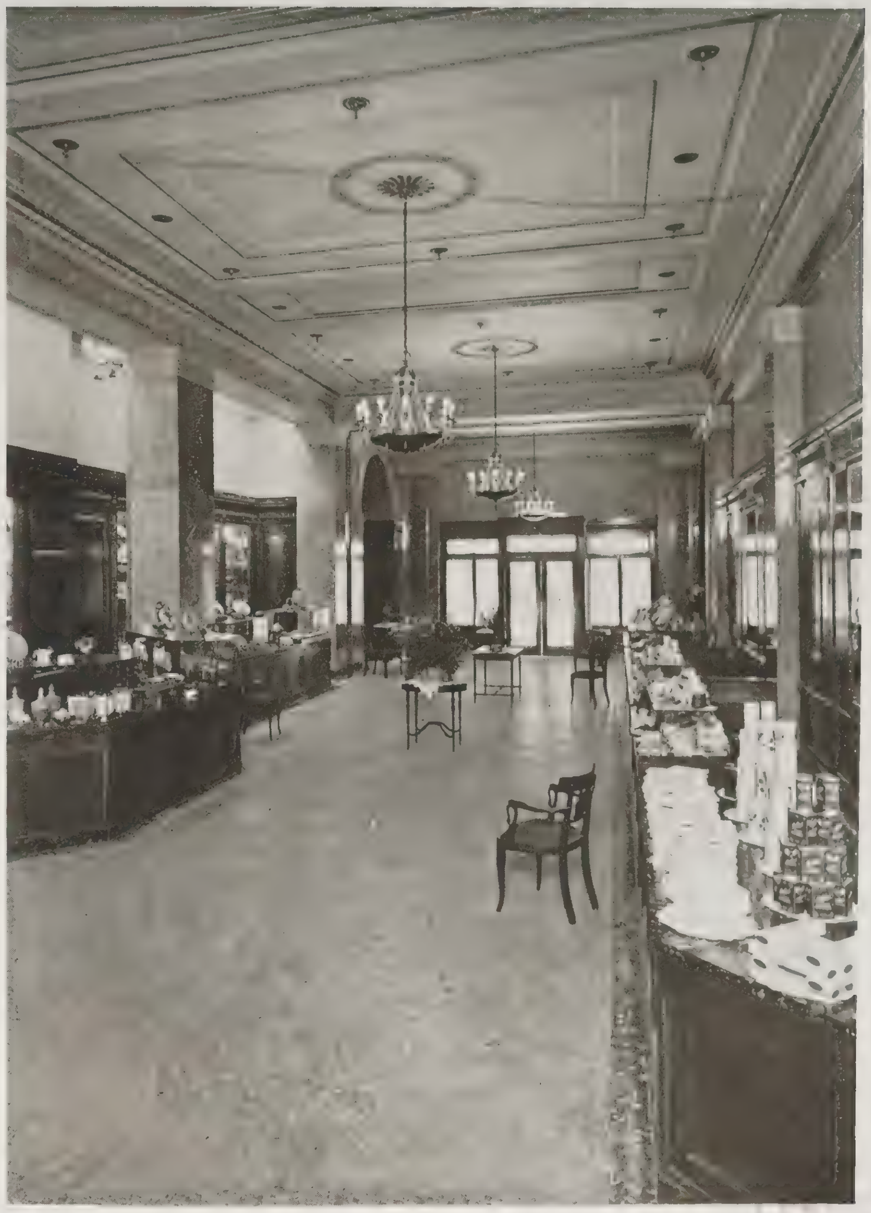
## STEIGER VEDDER CO.
## HARTFORD

### Lower Illustration, Plate 82

In Hartford is found another interesting example of a well studied store front by Buchman & Kahn, Architects. The building itself is built of limestone in a simple adaptation of the Colonial style, the three upper stories showing well proportioned and well spaced fenestration to which sashes with small panes give scale. Unfortunately, in the two lower stories of the building architectural design had to be subordinated to commercial requirements, so that the usual large show windows and entrance doors with heavy canopies are found. The transom lights with their bronze baluster treatment give a continuous decorative note along both facades of the building. The triple arrangement of the design of the lower story has been repeated on the floor above.



ENTRANCE FRONT, MAILLARD'S, NEW YORK
CROSS & CROSS, ARCHITECTS

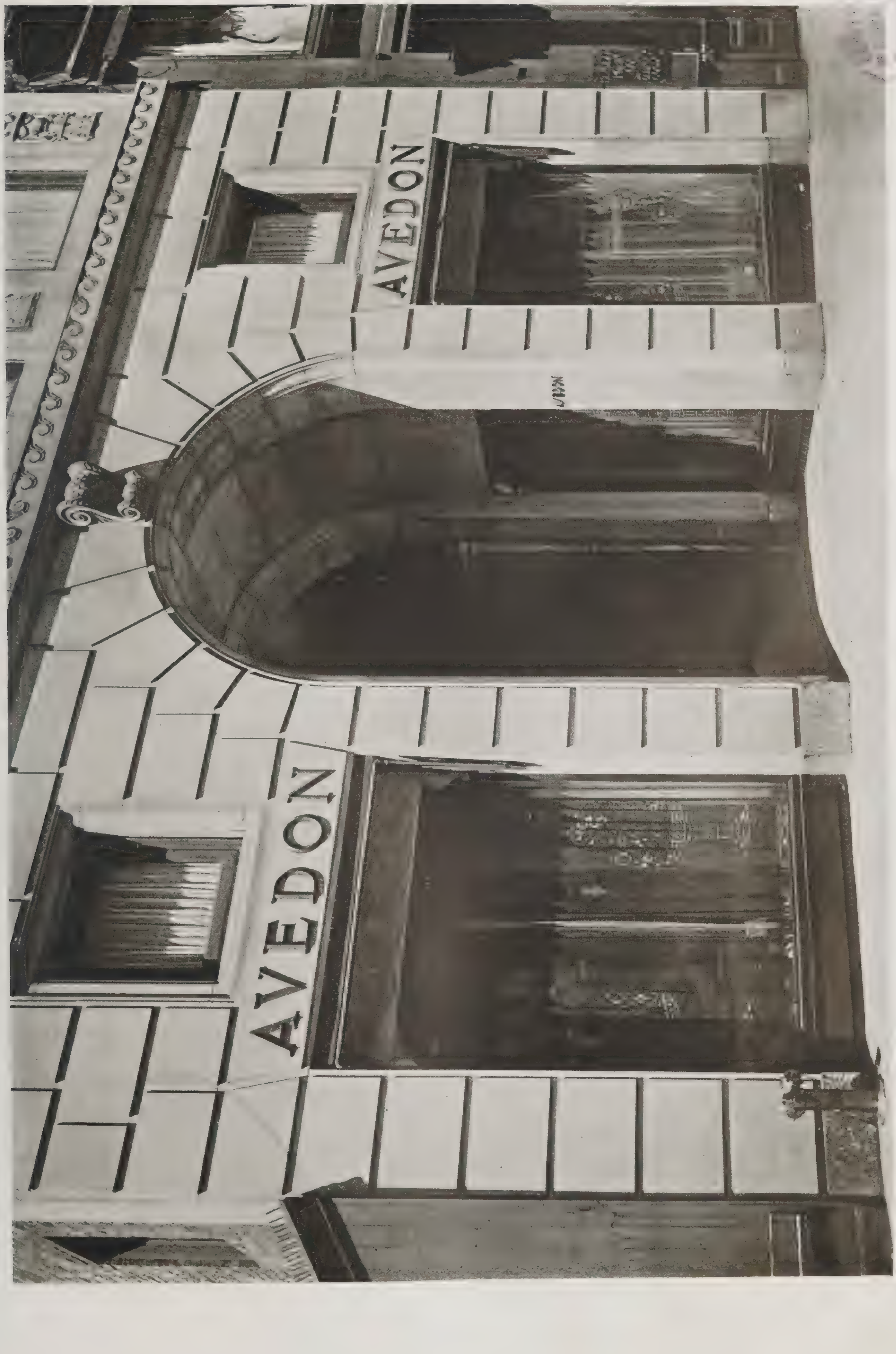


INTERIOR OF CANDY STORE, MAILLARD'S
BUCHMAN & KAHN, ARCHITECTS

# MAILLARD'S, NEW YORK

Illustrations, Plate 83

This is one of several similar motifs which make up the design of the basement stories of the new building recently erected by Cross & Cross, Architects, on Madison Avenue. This particular bay serves as the front of Maillard's new candy shop and restaurant. A certain feeling of scale has been obtained by dividing this high opening with colonnettes, cornices, mullions, and panels of bronze, carried out simply in a style which suggests that of the brothers Adam. The recessed doorway gives added depth to the show windows on either side and a shadow value not found in surface doorways.

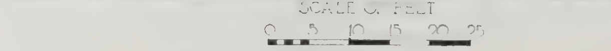


STREET FACADE OF A FIFTH AVENUE SHOP, NEW YORK
HARRY ALLAN JACOBS, ARCHITECT

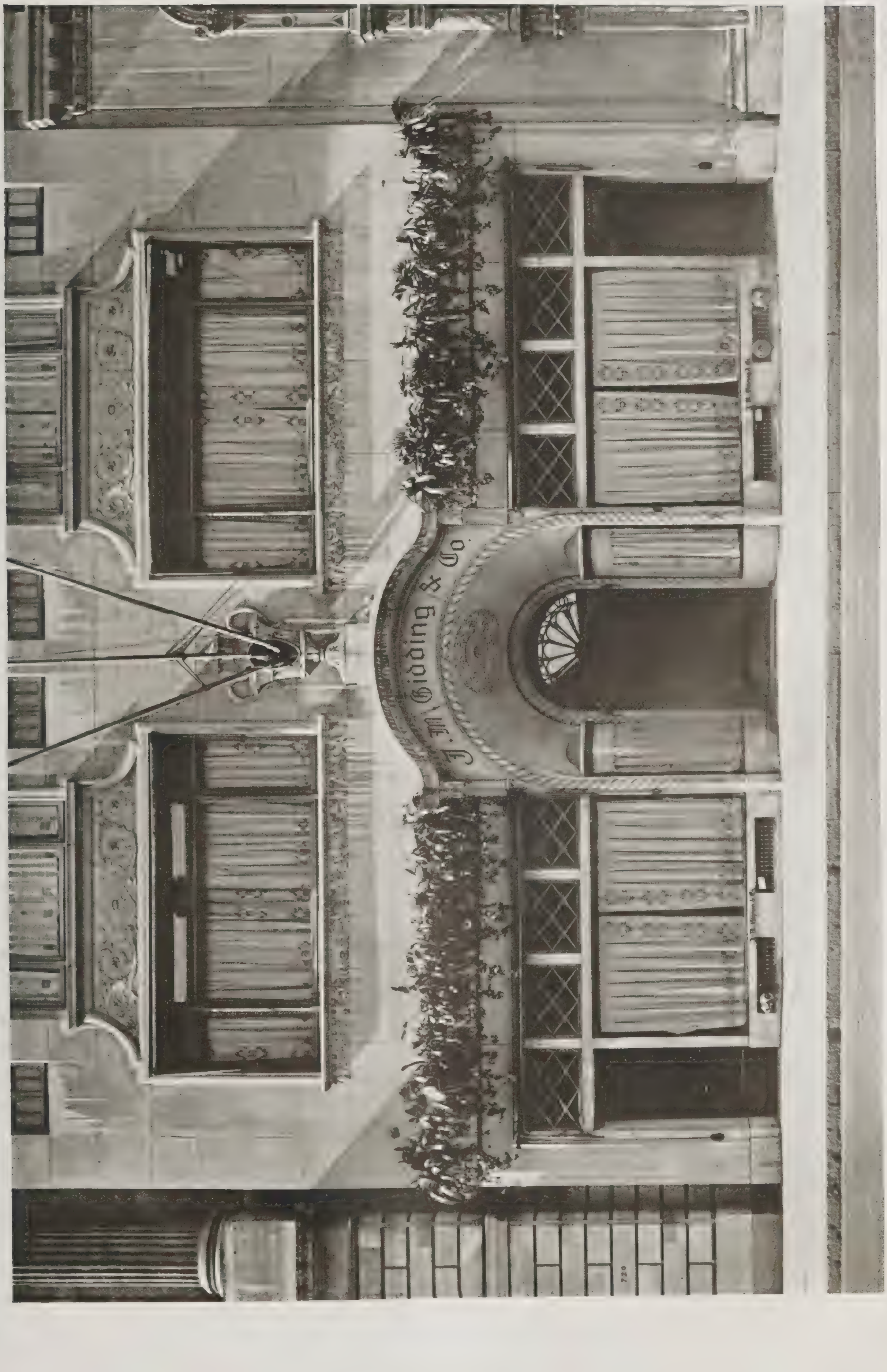
## SHOP OF AVEDON & CO., INC.
## NEW YORK

Illustration, Plate 84

In the design of the Avedon shop is found an example of the latest type of shop development, the "arcade," which is steadily becoming more and more popular, not only in cities of the East but in the Central and Far West as well. The "arcade type" has many advantages to offer, although few of them have been carried out with such architectural skill as in this shop where even the front show windows are an integral part of the architectural design. From the point of view of commercialism no type of shop front as successful has yet been designed. The would-be purchaser or "window shopper" may enter under the protection of the entrance arch and rotunda to examine, without annoyance from street crowds or solicitous clerks or inclement weather, the latest merchandise shown in the display windows. In addition to the two front windows, within the arched entrance there is a vaulted vestibule lined on either side with show windows. Thus with a comparatively small avenue frontage it becomes possible to provide a number of interior show windows sufficient for making at one time a complete display of the newest goods offered for sale within the store.



FIRST FLOOR PLAN



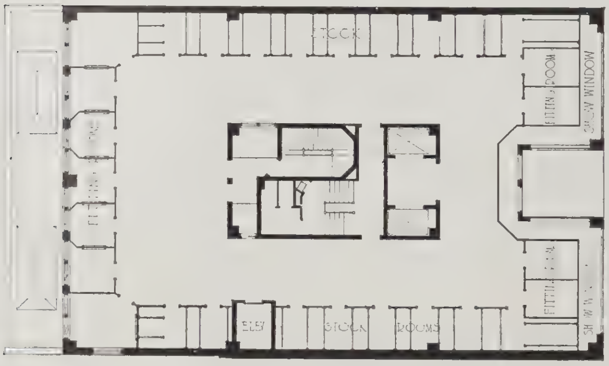
A RECENT STORE FACADE, NEW YORK
SEVERANCE & VAN ALEN, ARCHITECTS

## SHOP OF J. M. GIDDING & COMPANY, NEW YORK

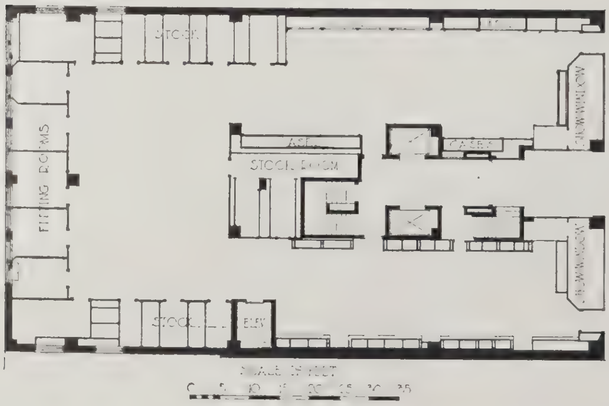
### Illustration, Plate 85

Among the interesting shop designs completed within the last two years is that for J. M. Gidding & Company, The exterior shows a spacious recessed and arched entrance containing small show windows on either side. The location of the small side entrance gives balance and symmetry to the elevation of the store front proper. As so often happens in modern store fronts, there is little architectural relation or connection in spirit between the windows of the upper stories and the treatment of the first story. In spite of the lack of architectural unity and cohesion, the facade as a whole is interesting on account of the shape and location of the upper windows and the carefully placed and skillfully executed carved decorations.

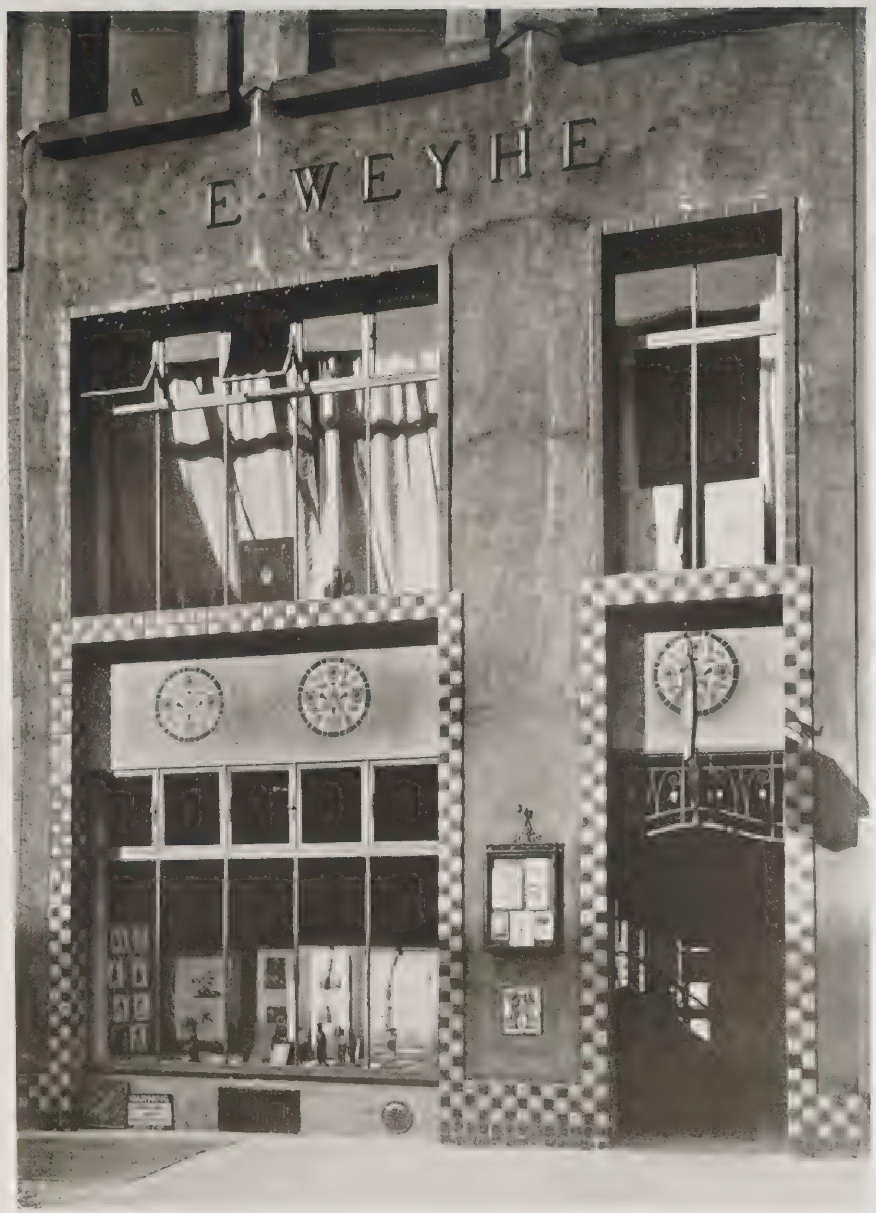
The floor plans of the interior, shown here, have been logically worked out to meet the practical requirements of a firm specializing in one class of goods.



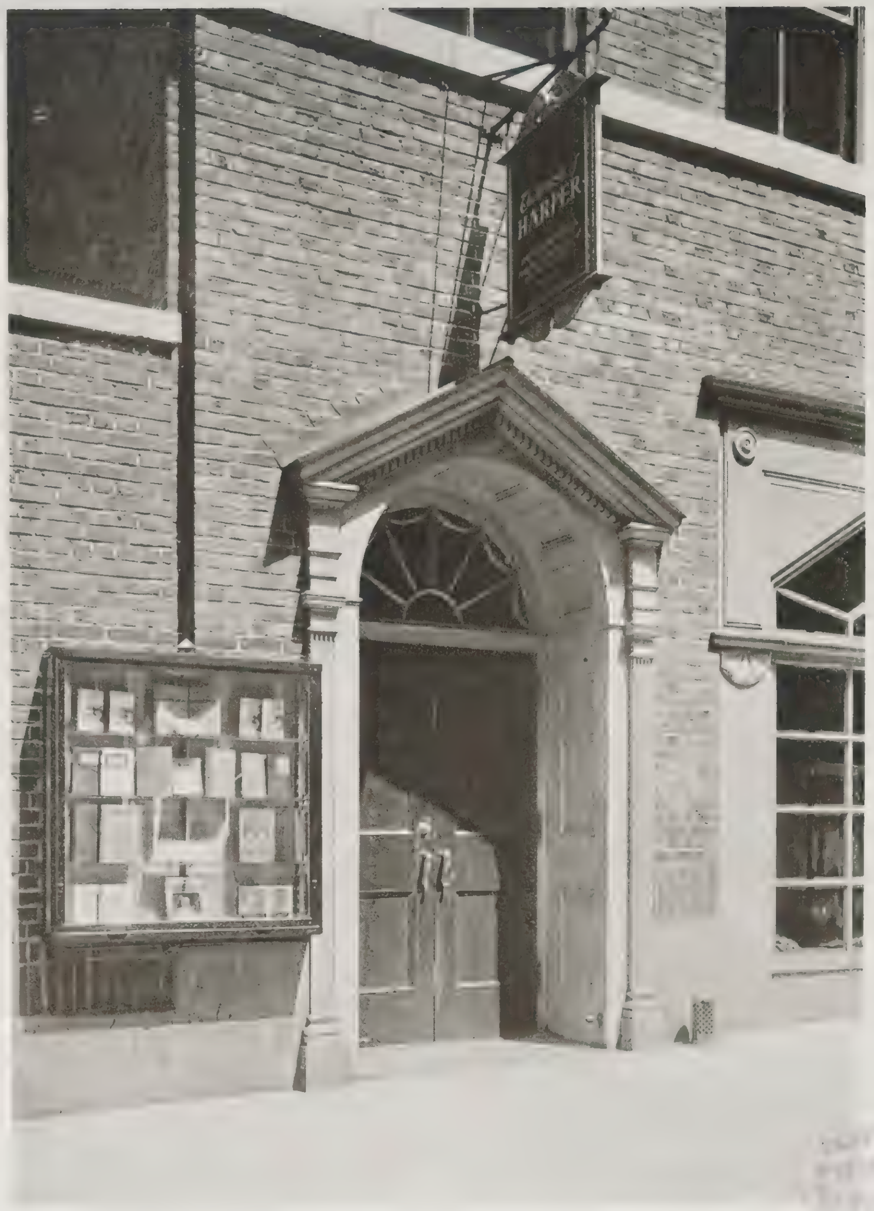
SECOND FLOOR PLAN



FIRST FLOOR PLAN



INTERESTING DESIGN FOR A BOOK SHOP
HENRY S. CHURCHILL, ARCHITECT



ENTRANCE DETAIL, HARPER BUILDING, NEW YORK
WARREN & WETMORE, ARCHITECTS

## ENTRANCE DETAIL, HARPER BUILDING, NEW YORK

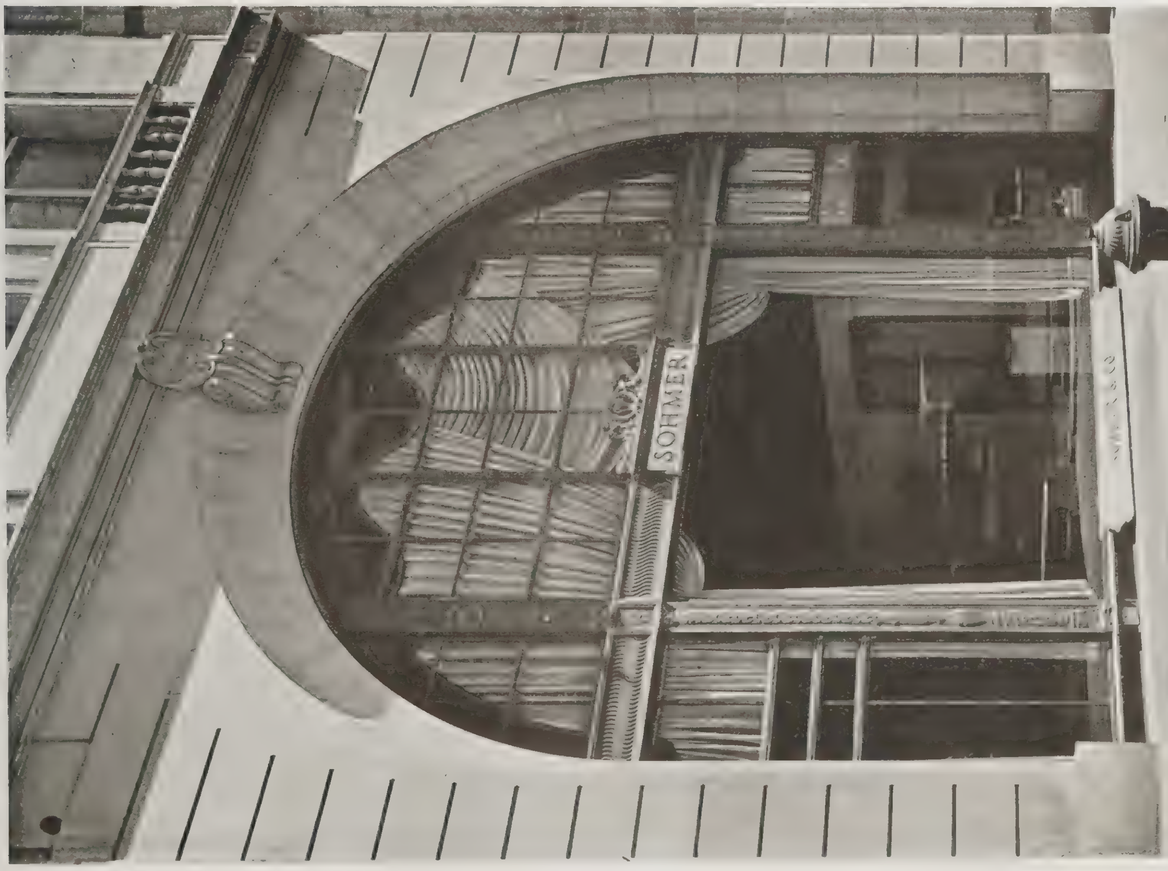
Upper Illustration, Plate 86

On East 33rd Street, Warren & Wetmore have recently completed a commercial building for the use of Harper & Brothers in which simplicity and straightforwardness of design are evident. The detail of the entrance door shown here is a particularly good example of the adaptation of Colonial precedent. The pilasters, pediment, mouldings and panels of this doorway are in excellent scale themselves, but do not seem to agree in either scale or character with the heavy treatment of the long, low show windows, in which horizontal instead of vertical panes of glass have given a strange effect.

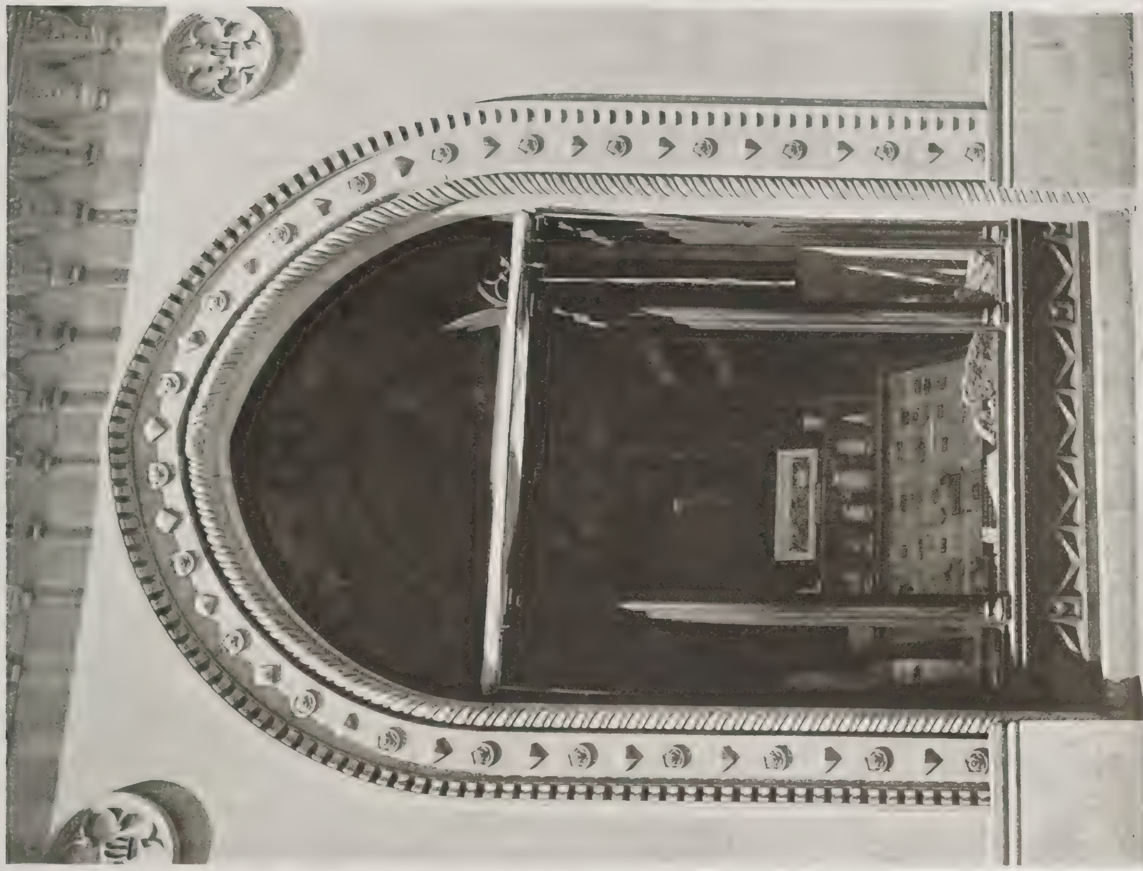
## BOOK SHOP OF E. WEYHE NEW YORK

Lower Illustration, Plate 86

It is unfortunate that in a black and white reproduction no idea of color may be obtained, for half of the interest or originality of this bookshop front is due to the strong colors combined. The walls are covered with deep terra cotta colored stucco which is relieved in the trim of the window and door openings by tile in rich blues and yellows. Over the entrance door and lower show window a further decorative effect has been secured by the introduction of medallions of decorative tile. In design the entrance and show windows are carried up into the second story in a somewhat similar treatment, giving an added height and dignity, which combined with the scale derived from the several divisions of each window produces a very original effect.



RECENT FRONT FOR A PIANO SHOP
RANDOLPH H. ALMIROTY, ARCHITECT



WINDOW DETAIL, JOHNS-MANVILLE, INC. BUILDING
LUDLOW & PEABODY, ARCHITECTS

## JOHNS-MANVILLE, INC.
## NEW YORK

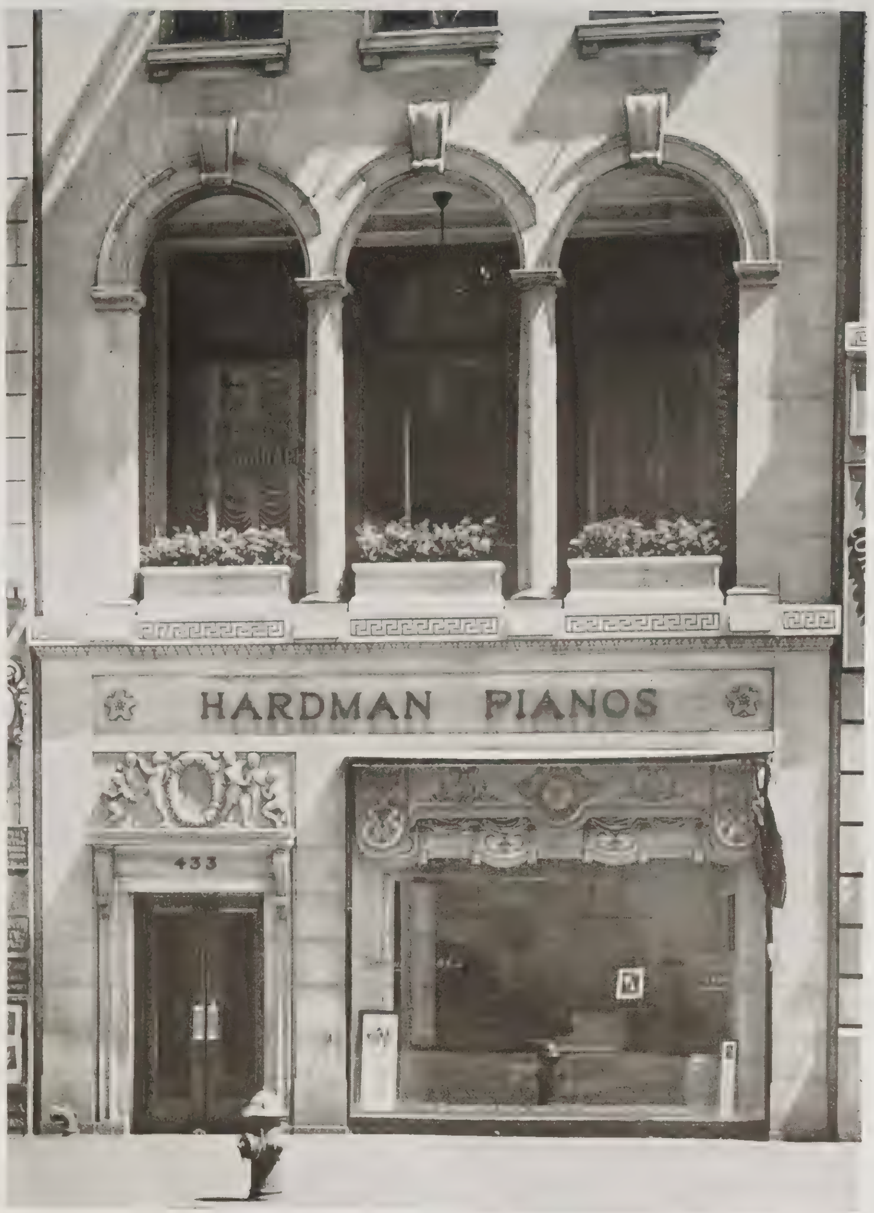
### Upper Illustration, Plate 87

This window is one of several which form the motifs of the basement story on the two street facades of the Johns-Manville, Inc. building. It has been selected as an excellent example of the combination of style and scale possible in a shop window. The design has been carried out in an adaptation of the Italian-Byzantine architecture found in Ravenna and many of the towns of northern Italy. The very character of this style has given an opportunity to use detail in small scale, which scale has been repeated in the unusually well designed bronze detail of the window frame itself. This detail consists in simple Gothic colonnettes supporting a delicate cornice upon which rests the transom of the window. The bronze framework of this transom sash continues the line of the colonnettes and introduces as decorative features quatrefoil designs in open bronzework.

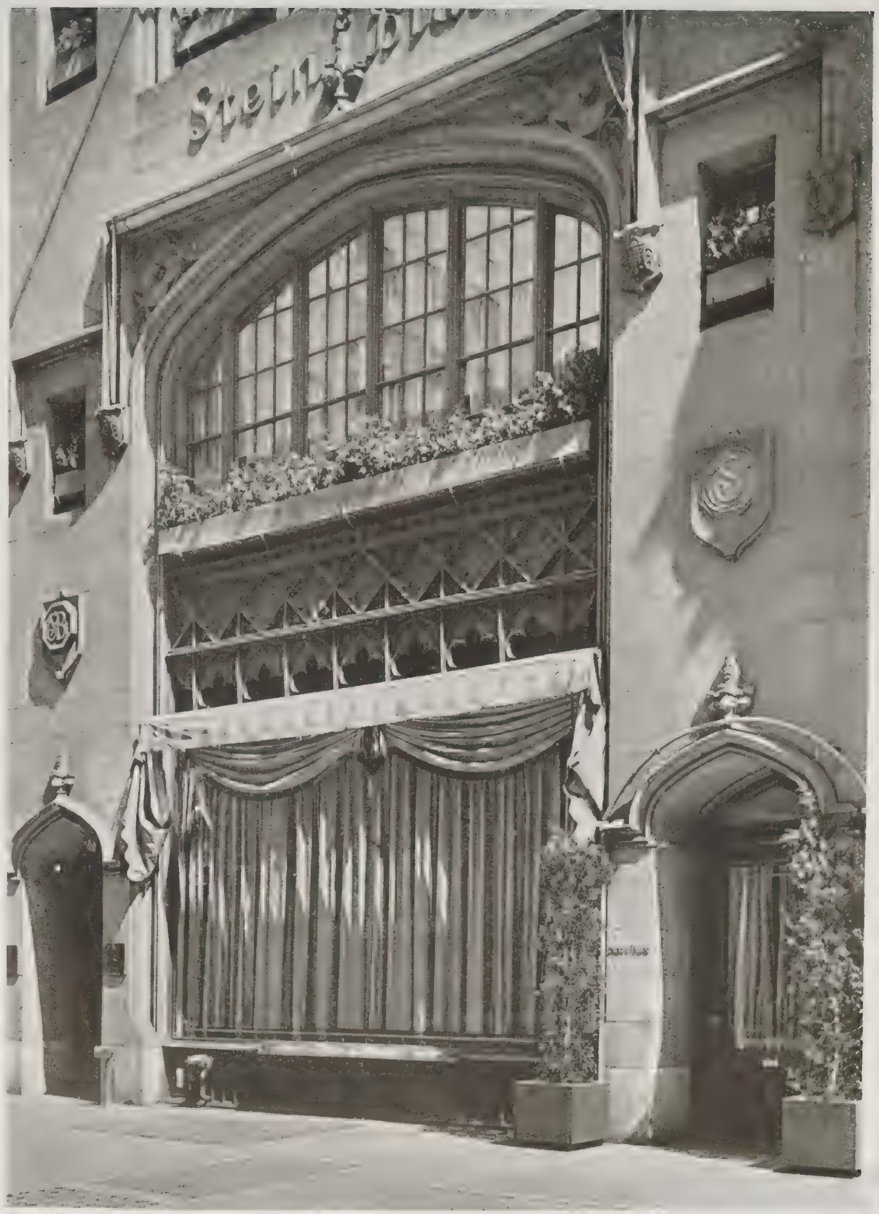
## SHOP OF SOHMER & CO.
## NEW YORK

### Lower Illustration, Plate 87

This shop front affords an interesting study in the relation of architectural design to requirements. To show off pianos to their full advantage, commercial needs seem to demand that there shall be at least one large show window of plate glass, so in this arrangement we find a stone arch enframement suggestive of the latest period of Italian Renaissance. Bronze detail, executed with extreme delicacy, gives successful scale to this large opening and forms a perfect setting for a single show window. Not only do the bronze panels and muntins of the upper half of the window add interest to the entire design, but the window hangings themselves give a pleasing expression of unity and coherence to the entire building.



A SHOP FRONT IN THE RENAISSANCE STYLE
HARRY ALLAN JACOBS, ARCHITECT



EXTERIOR OF NEW STORE FOR STEIN & BLAINE
RENWICK, ASPINWALL & TUCKER, ARCHITECTS

## NEW STORE FOR STEIN & BLAINE NEW YORK

Upper Illustration, Plate 88

Executed as a simple adaptation of the French style of Francis I, this well studied design shows an interesting balance in detail and appreciation of scale. The center motif is a single high, four-centered arched opening in which a combination of small window panes in the upper portion and bronze panels in quatrefoil design across the center of the opening give a definite scale to the entire design. In the lower half of this opening, commercial requirements necessitated a single display window, in which the many folds of the draperies repeat the small scale of the details above.

## HARDMAN, PECK & CO. NEW YORK

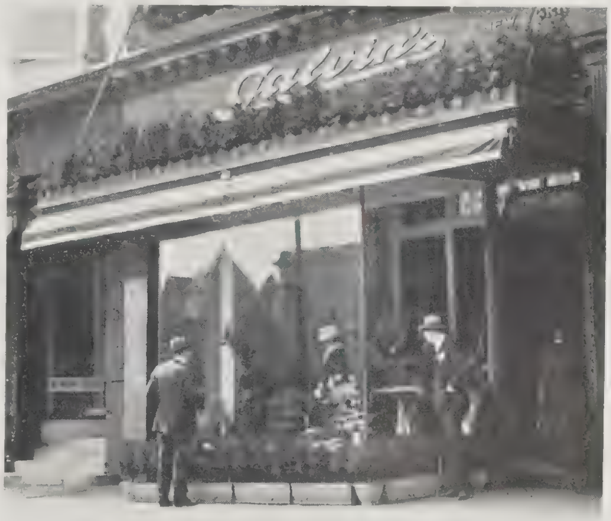
Lower Illustration, Plate 88

Here is a design in two parts in which unfortunately there is little relation between the upper and lower stories. But the design as a whole shows a degree of study for an architectural effect which makes it worthy of consideration. The lower half is divided into a single show window sufficiently low and large for the display of pianos and a single entrance with elaborate carved ornamentation above. A long horizontal panel containing the name of the firm helps to tie together the design of the lower half of the facade. The three well proportioned arches which form the second story arcade make an interesting architectural motif replete with possibilities for use as a shop front design. Even here, although located on the second floor, a large show window is introduced a few feet behind the arcade. This treatment has recently been carried out in the heavier style of the Spanish Renaissance in some of the newer shops in Los Angeles.

# Recent Shop Fronts in New England

By DANA SOMES

OUR *maitresse jalouse*, Architecture, is fast becoming the handmaiden of the shopkeepers, and with quickening pulse we note that she is more and more being made to serve the ends of Advertising,—goddess from the machine of business. The shopkeepers are seeing her value, and in these days of scarcity of domestic labor are becoming willing to pay the wages of this humble handmaiden. So in the larger cities, as the value of well designed shop fronts is becoming more appreciated, little oases in a desert of plate glass and cast iron are beginning to dot the streets with better shop facades.

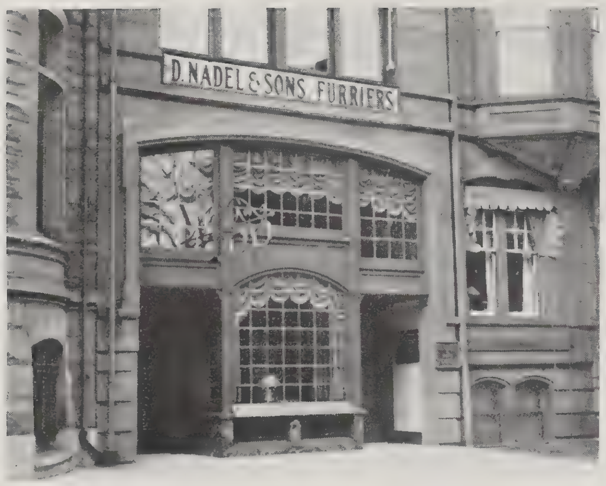


Exterior of Flower Shop, Copley Square, Boston
Designed by Elsie Cobb Wilson

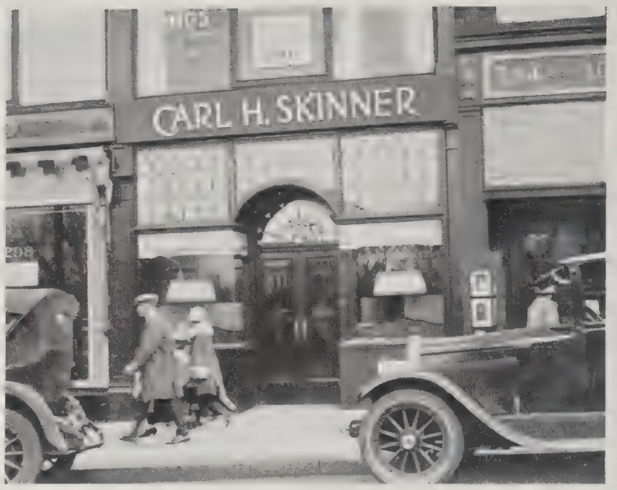
It is also being recognized that all store front problems are not alike and that the functions of the store window may be widely dissimilar. Paradoxical as it may seem, the store window, with some exceptions, is no longer intended to serve as a real window. Occasionally the entire interior of a shop may be treated as show space, and under such circumstances the front does become window *per se*, through which the passer-by may glimpse a view of the whole interior. This is well illustrated in the case of the Thomas F. Galvin, Inc. shop in Copley Square, Boston, designed by Elsie Cobb Wilson, where a charming vista of flowers and plants extending to the rear of the shop is disclosed. Usually, however, the function of the modern store window is to serve as a display place for wares for advertising purposes, and in such cases it is generally cut off by more or less opaque walls from the rest of the shop.

As a means of lighting, the shop window has ceased to function. The treatment of this sort of window may be roughly classified into three different types: The first type of treatment is that which by its general character identifies and advertises the store without placing particular emphasis on display. In this sort of design the architect may exercise considerable freedom. He may introduce orders and pilasters and small panes to his heart's content and still leave the proprietor confident that the front will serve its purpose and attract attention from afar. For the most part such types seem to be confined to candy shops, tea rooms and the like. Considerations of display being secondary, it follows that these fronts are rather shallow, and the entrances are placed as near the sidewalk as is conveniently possible. New England cities and towns are favored by a number of good examples of this sort, of which a few of the most recent are here illustrated. For example, the front of Pollard's optical supply shop on Newbury Street, Boston, is of a character which unmistakably expresses the use of this shop and has been developed in a pleasing scale which focuses attention primarily to the nature of the business rather than to a prolonged inspection of the window display. In view of the fact that in this type of business an extended display is unnecessary, the designer has sought for architectural character rather than for the brilliantly lighted arcaded front which might be required for other types of occupancy. A similar example is shown in the illustration of Sargent's candy shop in Providence on page 250.

The second general type is the most common and the hardest problem for the architect, and presents the greatest opportunity for a contest with the owner, for he will begrudge the use of a fraction of an inch for anything but plate glass, and unfortunately his attitude is absolutely reasonable. In this type the primary consideration is to provide the show window intended for the display of a large assortment of miscellaneous small objects without any particular attempt at grouping and often with no relation one to another. The proprietor justly claims that the number of objects shown bears direct ratio to the advertising obtained, and hence he must have the maximum unobstructed space. If the architect can squeeze out a few inches on each end of the front to satisfy his craving for some apparent support for several stories of solid masonry above, he may count himself lucky. Fortunately for him, however, it is difficult to attract the passing attention to a greater height than 9 or 10 feet, and above the transom line there is some opportunity to bring the plate glass below into some semblance of human scale and structural reasonableness. This has been done admirably in the Carl H. Skinner jewelry shop on Boylston Street, Boston, by Shepard & Stearns,



Optical Supply Shop, Newbury Street, Boston
Henry Bailey Alden, Architect

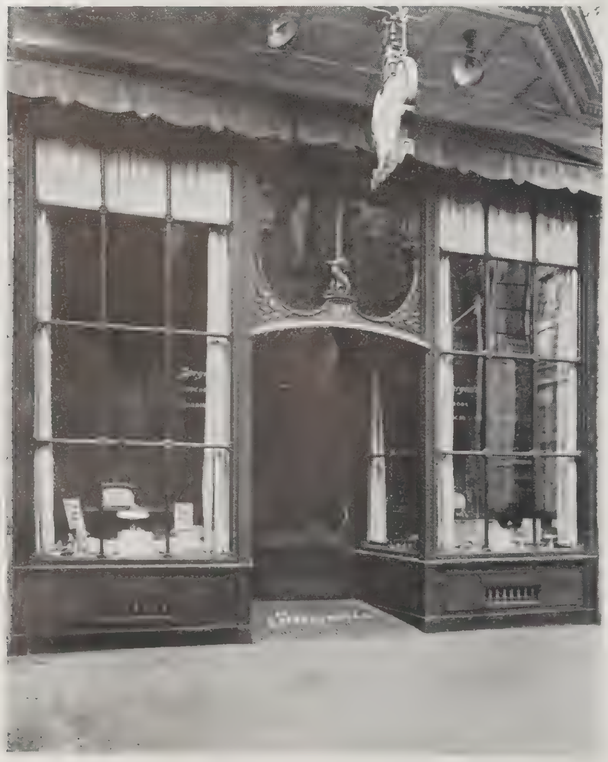


Scale Given by Well Designed Transoms
Shepard & Stearns, Architects

where black leaded glass with silver rosettes has an admirable sparkle, serving to emphasize the display. An equally effective recent example is the shoe shop by Strickland, Blodgett & Law, designed for "Queen Quality" on Tremont Street. Here much of the trouble from reflection has been cleverly overcome by making the front slightly concave. In the block on Charles Street a simple attempt has been made to bring the shops into scale with the rest of the building by colonnettes and small panes above the transom, small panes being used at windows above.

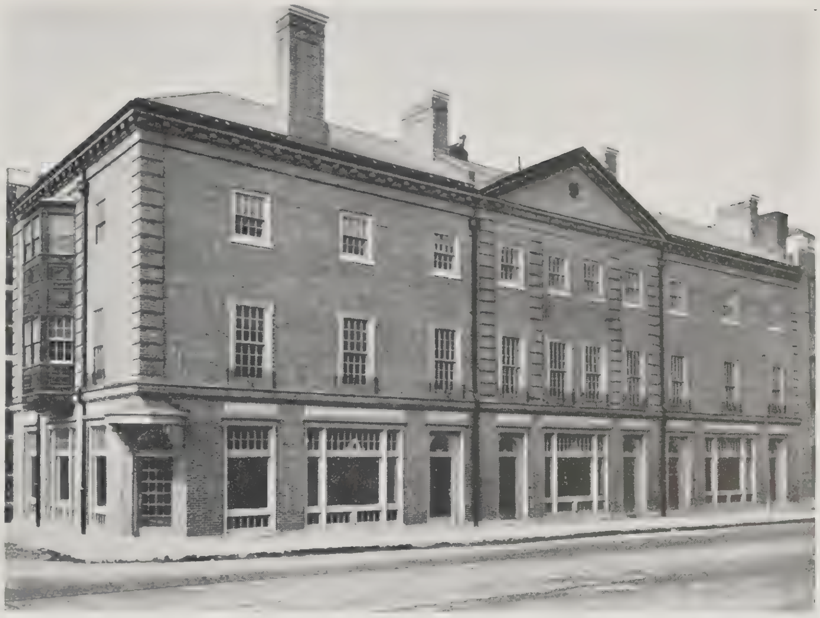
The third type of treatment is that in which each individual show window may be considered as a framed picture to hold one or two large objects—manikins, automobiles, pianos, or what not. It is in this type that the architect has unlimited opportunities both in plan and elevation to exercise his ingenuity, and yet, with the exception of a few New York examples, the possibilities have barely begun to be developed. It is usual in this problem to devote a deep area of the front of the store to show space, with the result that the entrance door is recessed a long way back from the street and flanked by windows on either side. In the past these windows have been entirely of plate glass, and in consequence the unframed picture within has floated off into space, failing to attract the maximum attention. In the future such windows will have well defined frames for each object or group of objects, composed of architectural features or at least drapery. In such cases the approach is flanked as in an art museum by a series of pictures, each complete in itself and each leaving a definite impression on the mind. This idea is usually at first not within the conception of the proprietor of the store, but a little visual demonstration with framed and unframed pictures will usually convince him of its value. A further development of this idea is the setting of kiosk-like showcases in the midst of the entranceway, housing perhaps a single gown manikin visible from all sides. Of course, the practical effect of this deep sort of entrance is to greatly increase the linear footage of show front, and the plan may legitimately become labyrinthine with this object in view. In Boston there are few examples of this type as compared with other cities. The Dorothy Dodd Shoe Co. store shows a successful treatment of the deep entrance, although because of their use for display of small objects, the windows are not framed individually.

Bearing in mind the pictorial quality of such windows, careful attention should be paid to the back wall of the window in search of color and texture which will serve as effective backgrounds for its



Facade of Candy Shop, Providence
Strickland, Blodgett & Law, Architects

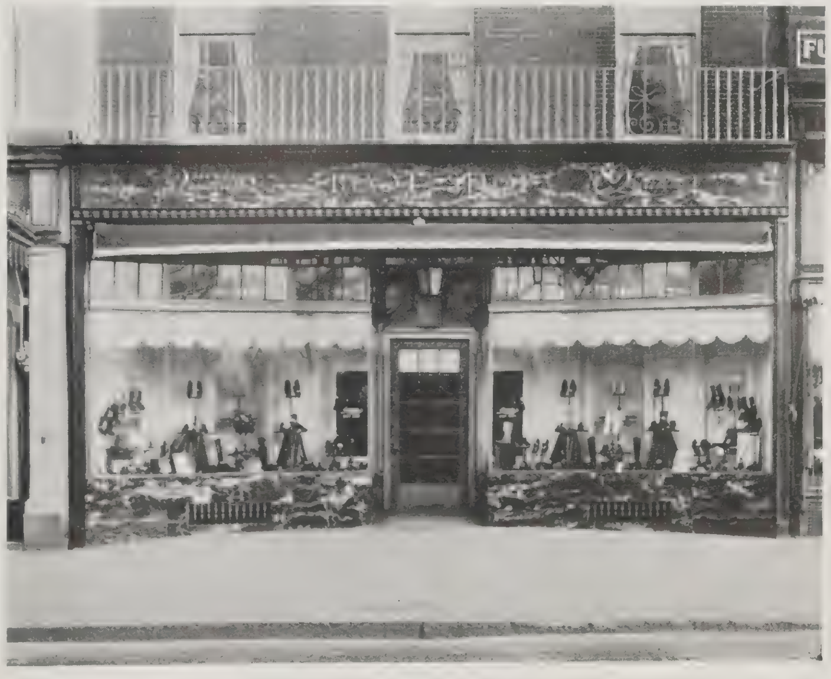
ever-changing display. With the recent development of texture paints, many interesting and inexpensive wall surfaces are now used in place of the conventional wood paneling. Often in gown shops or furniture stores the entire space is treated as the interior of a room and furnished as such,—the envious passer-by perhaps beholding an *intime* picture of family life at the breakfast table as it might become by the use of the "One Perfect Dining Room Set."



Building Containing Shops and Apartments, Charles Street, Boston
Dana Somes, Architect

The discussion of the deep entrance leads us into the subject of the entrance door. In the normal 25- or 30-foot front, should there be a single entrance or side entrances? Each problem being different, it is difficult to lay down arbitrary rules, but in the majority of cases the single central entrance would seem to be the most desirable. Shoppers, like other human beings, are creatures of habit, and it has been established that the counter space on the right-hand side of the entrance for the first 20 feet is astonishingly more frequented than any other part of the store. This being the case, an entrance door at the right-hand side of the shop crowds this most valuable space. On the other hand, the left-hand entrance throws the customers toward the back wall of the show window and blocks the circulation of the emerging purchasers. In any case, this problem is determined largely by the character of the shop and the methods of sale. We need have considerably less worry over the opportunities for ample circulation for the occasional purchaser in a piano store than for the crowd of a "5 and 10."

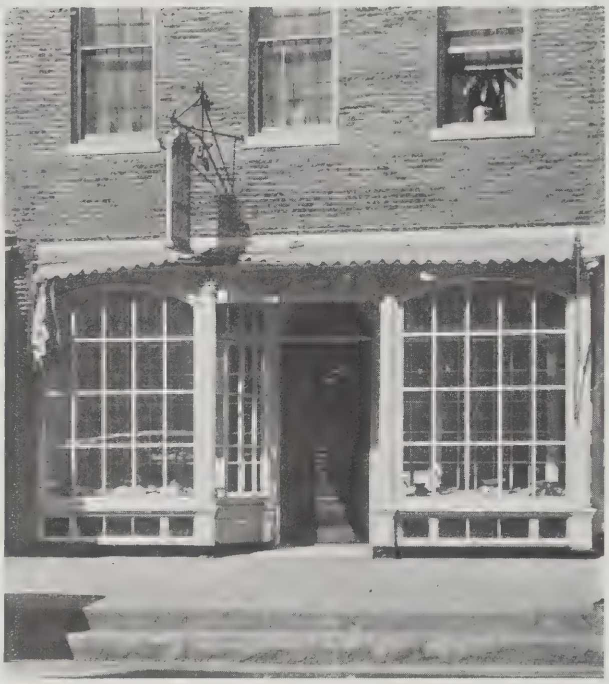
Perhaps one of the most harrowing tortures that the architect has to experience is that of seeing his thoroughly satisfying facade, some weeks after its completion, blossom out with all manner of heterogeneous signs hung in sketchy disregard of cornices, entablatures and the like. The architect's guardianship terminated, the sign salesman has grabbed the owner, and "scientific salesmanship" has resulted in signs—red, green, blue, gold, silver and brass, not to mention the animated electric. The only reasonable, sure way of combating this menace is to provide amply in the original design for all necessary signs both by day and by night, and in the preliminary sketch season gently to convince the proprietor that his name legibly inscribed once is just as effective as if repeated 35 times in as many square feet of space. Having done this, the designer must resign himself to the almost inevitable additions. It follows that it is usually desirable to provide for lighting the signs effectively. This is usually best accomplished by flood-lighting from concealed lights in the cornice soffit. Often hanging brackets and lanterns can be used as attractive features of the design, particularly if they suggest the use to which the store is put. The lighting of the



A Slightly Concave Front, Tremont Street, Boston
Strickland, Blodgett & Law, Architects

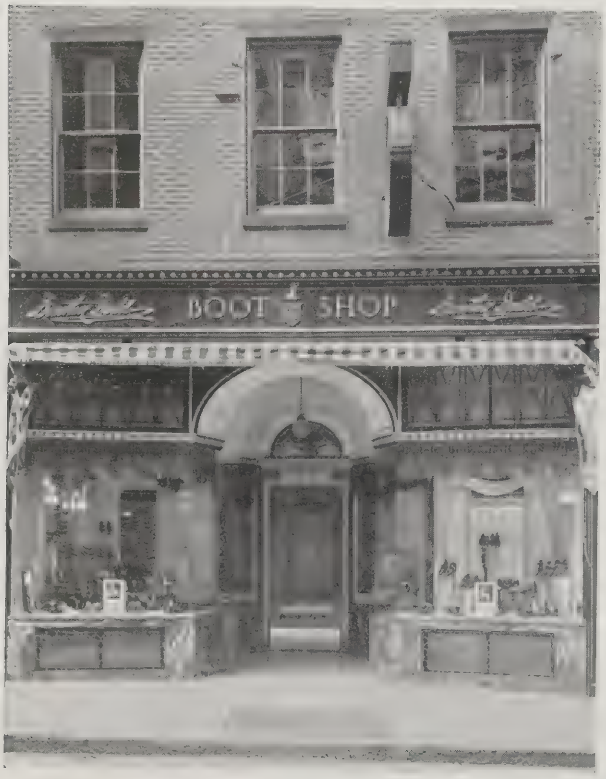
show windows is most important and is usually best accomplished by flood-lighting from behind the transom or jambs. As an exception to this method, the shaded hanging lamps in the Skinner shop, throwing all the light downward on the bits of jewelry below, are most effective and useful.

In their interior lighting, shops seem to be coming more and more to the use of artificial light at all hours. Probably this is due principally to the fact that the show windows have now cut off most of the light from the front. However, where these windows are not too deep, it has become generally customary to use various kinds of prismatic glass above the transoms to throw the light over the tops of the windows into the store. This is worth while not only for the light but for the opportunity it gives for a little variety in the design of even the simplest front, an opportunity which is generally limited at best.

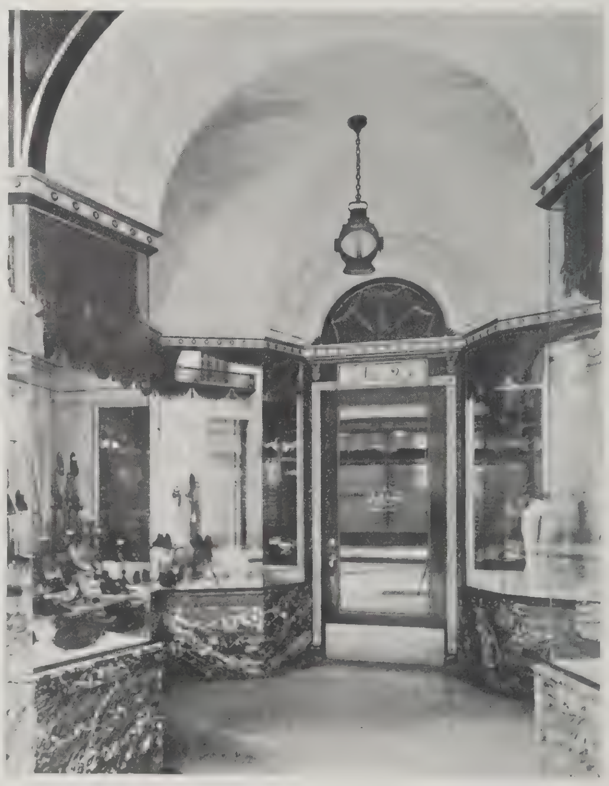


Well Designed and of Excellent Scale
Strickland, Blodgett & Law, Architects

We may well be encouraged by the attention given to this subject among the shopkeepers, and we may look in the future for more and more interesting developments in this comparatively new field, particularly if architects will bear in mind that owners are paying a large percentage of their rent for frontage and that the function of every square inch of such frontage is to advertise the goods within and not to serve as a screen on which the architect may display his entire repertoire of technical knowledge. The possibilities for original ideas of treatment are unlimited and as yet almost entirely undeveloped. The problem is not unlike that of the theater stage. We have only to contrast the stage-set of a decade ago with that of the present to realize its tremendous development under the inspiration of trained men. The creative imagination inherent in every architect can carry the display value of the shop in every way far beyond the point where shopkeepers and advertising men are now floundering.



"Deep Entrance" Front from Street
Strickland, Blodgett & Law, Architects



Effective Arrangement of Space in Vestibule
Note the Extent of Show Windows

# Two Specialty Shops in Cleveland

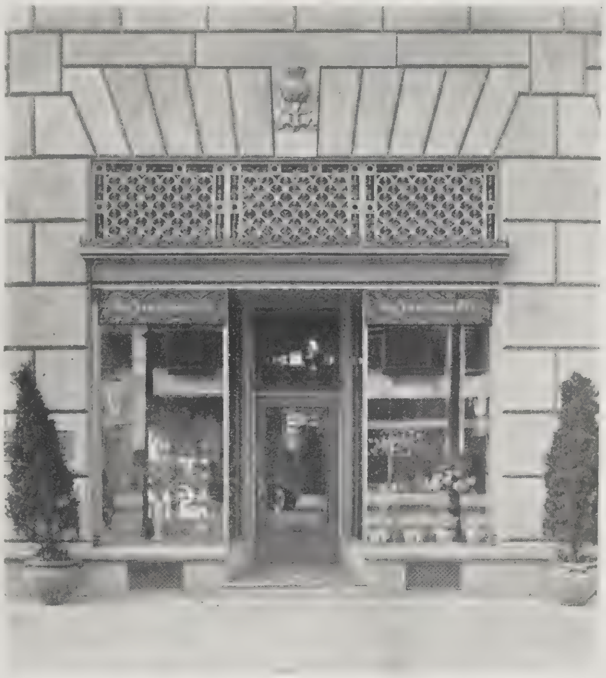
## WHERE A PERSONAL DESIGN WAS PERSONALLY SUPERVISED

*By* CARL W. BROEMEL

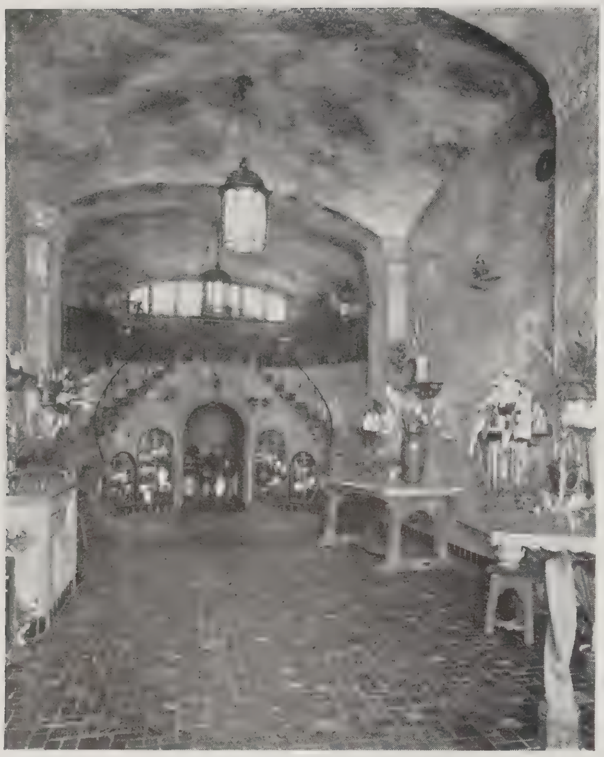
COÖPERATION is essential to every successful enterprise, whether it be building or business. For an architect to achieve success in any building he may undertake to design and construct he needs, first, the complete confidence and enthusiastic assistance of his client and, second, the hearty coöperation and intelligent support of his contractor. No matter how much time an architect may spend in his drafting room upon his drawings, if they are not intelligently and consistently carried out by the contractor his time in creating his building on paper has been wasted. Enthusiasm, like cheerfulness, is a contagious element of personal expression; it reproduces itself in all who come under its magnetic influence.

Enthusiastic coöperation between architect and craftsmen has made possible the artistic success of these two unusual shops, one a flower shop for the Jones-Russell Company, and the other a shop for the Mac Diarmid Candy Company, where have been demonstrated the theories that it is possible to interpret architecture in an artistic manner, and to increase the profits of business by housing it in attractive surroundings. In other words, it is good business to build a beautiful store, interpreting architecture from an artist's point of view. Personality plays an important part in architecture, quite as much as in sculpture or painting. But personality in design to be successful should be followed by the personal supervision of the designer in the execution of his design, whether he be architect or artist. Although the artist's viewpoint may be fundamentally different from that of the trained architect, the ultimate purpose of both is to create beauty. No design of the architect can be considered a perfect piece of architecture if it does not combine beauty with practical planning.

The side lights concerning the flower store and the candy shop are really of more interest than a description, inasmuch as the work delivers its own message. For instance, that a shoemaker should attempt to design a beautiful interior is hardly fair to himself or to the owner; that an architect should do so is both fair and natural, but that an artist with a meager experience but great enthusiasm for such work should do so ought to be not only possible but a natural endeavor. For, as an artist, he will endeavor to be individual, and, unhampered by an architectural training, he is quite certain to attack the problem from an entirely different angle. So much for the designer, but much more depends on the clients, which we will make brief by saying that in these two cases they were the best of fellows, anxious that their stores be a great success. Before starting the designing of the flower store, shops in several large cities were investigated, and it was astonishing to find not only mediocrity in the stores themselves but also an utter lack of real ideas, combined not infrequently with poor planning. It seemed that the people who sold flowers were entirely unaware of the beautiful commodity they were handling and had all settled down in a rut, building stereotyped stores and laying much stress on white enameled woodwork and German silver. In short, the setting for an outdoor product, such as flowers, was wholly hard and artificial, having no relation whatever to nature's most exquisite creation. It seemed that from the time of the first conference on this flower shop in Cleveland, the idea as it finally stands was resting in the back of the architect's mind in sufficiently tangible form, and that almost from the beginning the main idea was established, and into it, of course, went all the enthusiasm of a novice, fancy free and unfettered by style or precedent. He could find nowhere an appropriate style other than perhaps the Persian and Spanish, and upon investigation he found that these two styles of architecture are largely influenced by semi-outdoor life and usually act as a natural background for flowers and shrubs. They seemed especially suited to the purpose.


**Entrance, Jones-Russell Company Flower Shop**
Carl W. Broemel, Architect

If one can trace any influence in the design of the

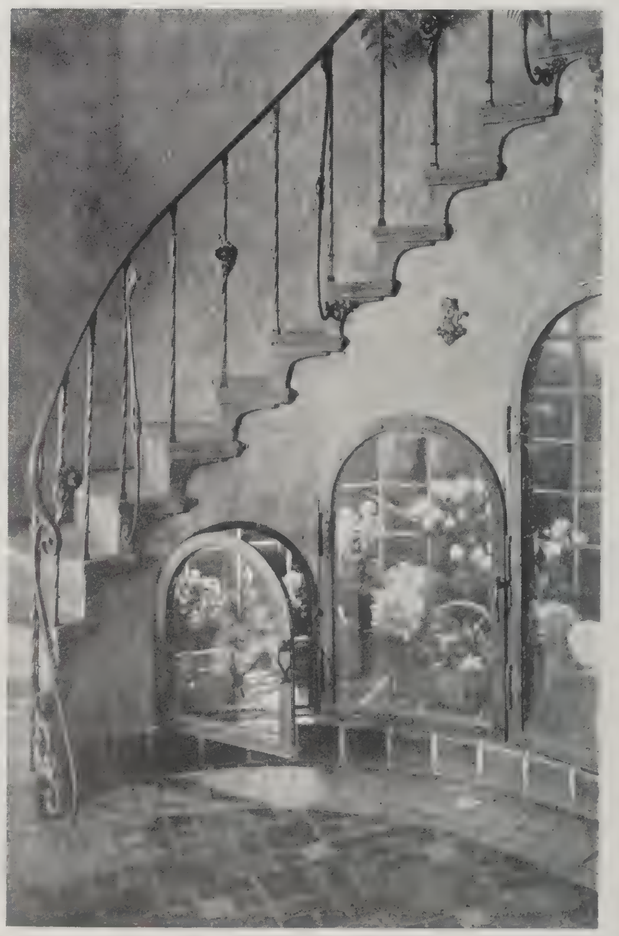


View From the Entrance

Jones-Russell Company flower store, it is from these two types of architecture and the drawings of Edmond Dulac. This was, of course, but half, and in the task of planning and adapting these ideas the architect put the cart before the horse by arriving at his idea first and adjusting the practical needs to it afterwards. Surely, not so bad either, to climb the pink cloud and then view the situation and its requirements from a lofty viewpoint.

The dimensions of the store were 18 feet in width, the same in height, and 60 feet long. With this space the architect was given a free hand, the only requirement being a specified demand for a good display refrigerator for cut flowers, and a mezzanine with an attractive stairway. The provision of either of these two things was not hard, but the two together, at first, seemed impossible, owing to the narrowness of the store. In the way it was finally worked out, the solving of the stairway problem immediately brought about a happy solution of that of the refrigerator. However, it placed the refrigerator in a precarious position under the stairway, which difficulty was overcome by suspending the stairway into the space below, thus allowing for a baffle wall of equal height to follow the curve of the mezzanine, which gives the hot air an equal distance to travel. This, it is believed, is the reason for the unusual success of this refrigerator. The system of refrigerating employed is the direct expansion ammonia with brine holdover tanks, the machine for which is installed in the basement, while the brine tanks are in back of the baffle wall. This baffle also forms an attractive background for the flowers, for instead of being of the customary mirrors, it is of black tile 10 inches square with wrought iron inserts literally creeping out of the joints at intervals, from which are suspended vessels for orchids, etc. Inasmuch as the florist's refrigerator is usually the product of an ice engineer, and a white enameled affair but one step better than that used for storing meat, one will recognize its unusual character.

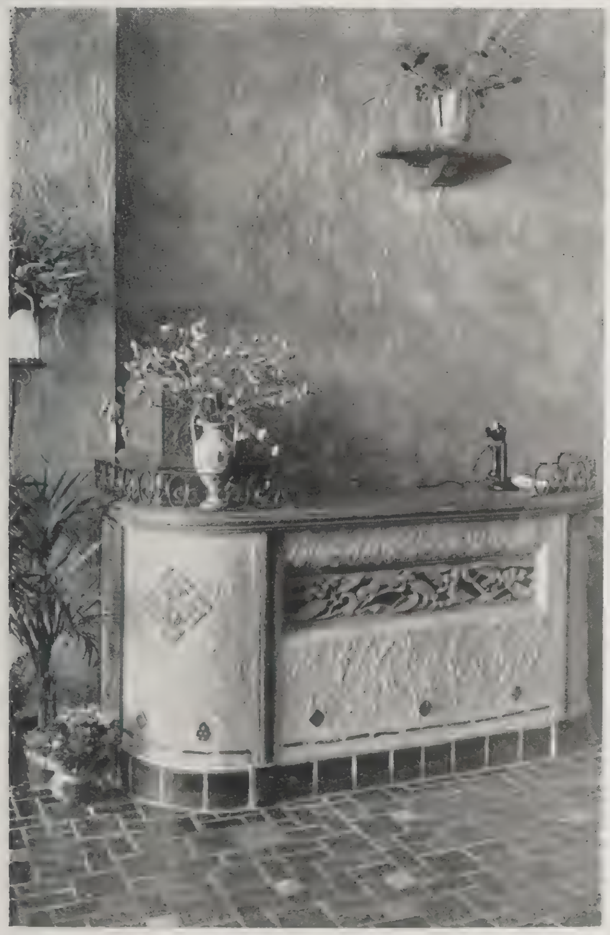
The first sensation upon entering the store is like that of entering a garden. The dark chocolate colored tile floor with its variegated inserts resembles the rich earth, while here and there warm lights glow behind ferns and plants. Nothing startles, while everything pleases, and at every turn one finds delightful surprises, maintaining interest through each succeeding visit. The furnishings are not like those of a store, with the exception of the cash register. There are no counters or show cases, but on the walls are many shelves of different lengths and designs, arranged as an artist would plan a composition, with no attempt at symmetry but much care for artistic grouping and placing. The walls and vaulted ceiling are of rough plaster; the ceiling, in tones of blue, green and tan, is darker than the walls which are warmer in various shades of siena, gray and lavender. The walls and ceiling, which were treated in transparent fresco directly on the wet plaster, received the personal supervision of the architect, and



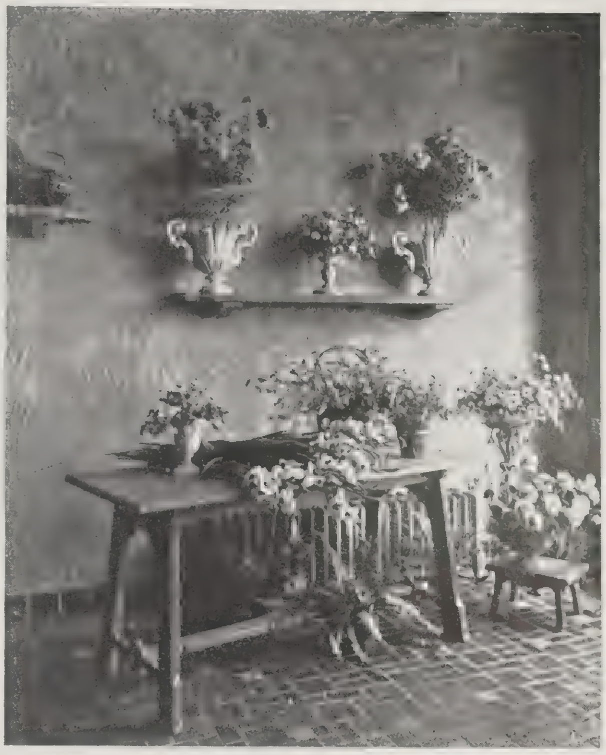
Curving Stairway to Mezzanine

the decorating was done simultaneously with the completion of the plastering. This is really the proper way of handling rough plaster walls. Furthermore, it is more durable and washable than oil paint, costs less, and as the process is one with that of plastering, no time is lost waiting for the plaster to dry, as the wet plaster receives but one immediate application. The work, however, must be done by an artist, as it requires spontaneous and artistic application of the colors. Most of the woodwork, which is all adz-finished oak, is carved in some form or other. The wrought iron is perhaps the best that can be seen in Cleveland. The cashier's desk and the work table, also the card desk, invite the visitor's immediate attention upon entering, the latter being a solid piece of oak carved into a twisted column, something like a mushroom, with a deep red, glowing lantern surmounting the top. Nothing has been slighted, from the outside to the rear of this store, and every detail seems to find its logical relation to the whole.

The MacDiarmid candy store is like the flower store in one respect only, that it is a fitting place for candy, just as the flower store is designed as a background for flowers. This store is almost next door to the other, but it is much smaller in length, and has an irregular depth. The interior has been confined to practically a cube of 18 feet in width, length and height. However, the rear of the store in reality runs at an angle, starting immediately back of the false door at the right and giving a depth of some 10 feet on the left sufficient, happily, for a stairway to the basement. In the main this interior is more like a jewel box, smaller but much finer and more elegantly fitted than the flower store. It seems a perfect setting for attractive boxes of bonbons, and this was constantly kept foremost in mind. In this shop again he was able to work fancy free. Such license, perhaps, leads to a certain lack of style, but withal a charming freshness and originality can be attained.



Desk for the Cashier



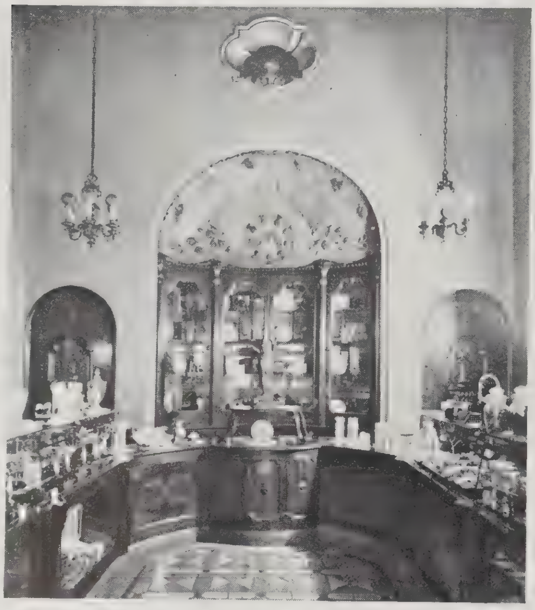
Toned Plaster Walls; Floor of Tiles; Woodwork, Adz-Finished Oak

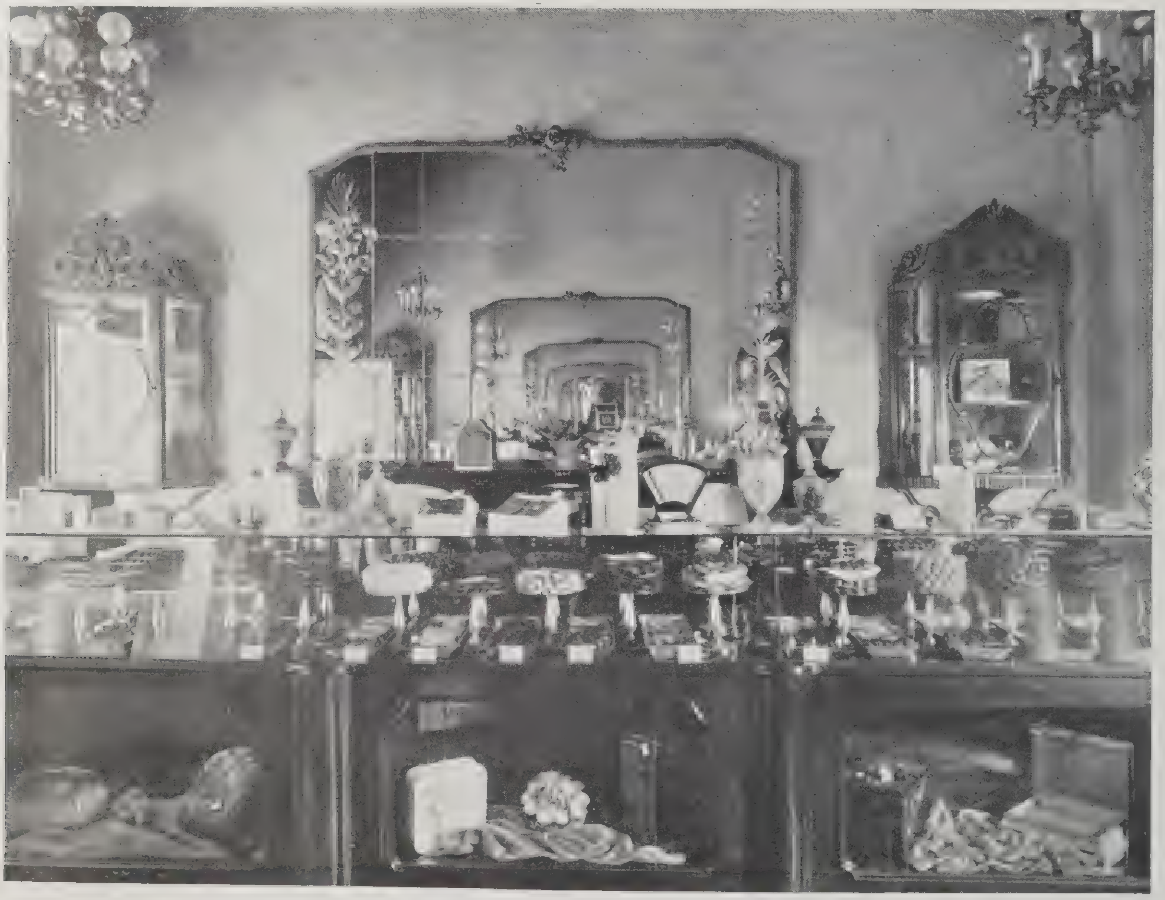
Upon entering the candy store one is immediately in the middle of the shop area, which has been confined to a horseshoe plan. The general color scheme is subdued in tone, the walls being a modified rough plaster in an old ivory shading toward a darker and colder tint as it reaches the intersections. The ceiling is several shades darker and more of a lavender cast, with a purple and gold glazed hollow cove moulding. Within this panel is a group of smaller panels, while centered down the middle are three low reliefs of fruits and flowers in rich color. The cornice, which by the way does not return around the room, is hand-modeled, not run. It has very little color other than a smoky warm gray, blending softly from the walls into the darker tint of the ceiling. The focal center of the store is the cabinet at the curve of the horseshoe, above which is a shallow shell decorated in low toned colors with a gold "M" surrounded by the Scotch thistle modeled in relief.

Directly in front of this ornamental cabinet, surmounted on a pedestal, is a magnificent bronze, the work of Lucy Perkins Ripley. Much could be said on the merits of this dignified figure, and much more on the fact that a candy store has seen fit to favor art in commercial life to this degree. The woodwork of the shop is its main attraction, and here again one feels the luxury and richness which seem to harmonize so well with the odor of chocolate. It is of American walnut with some Circassian, and is a magnificent piece of craftsmanship, as it is rich in carving, curved panels and drawers, circular and curved mouldings, with ebony and rosewood inlays and applications. The glass and wrought iron are exquisite in workmanship, the former being quite free in cut form. The floor is not slighted, but is made up of an interesting pattern of golden travertine and special tile in soft gray-blue and ivory with black inserts and edgings.

Two features to be noted are the openings in the lower part of the counter and the four cabinets on the wall. These little display windows are accessible from the rear and have flooring of ebony and walnut. On the wall cabinets can be found applications of carved rosewood and walnut, some of it cleverly attached to the surfaces of the glass. The lighting fixtures are equal to the surroundings, and are made of pewter, polychromed in gold and red.

These two stores teach one lesson clearly—that the commercial type of better store interior will vanish, and that the artist or architect will henceforth play a large part in the preliminary arrangement of stores, for as Frank Brangwyn claims, when artists give their minds to practical affairs, they show a range of common sense that men of trade cannot surpass.


View from Entrance, MacDiarmid Candy Store
Old Ivory Walls; Woodwork of Walnut


Counter, Showcases and Wall Decorations, MacDiarmid Candy Store
Carl W. Broemel, Architect

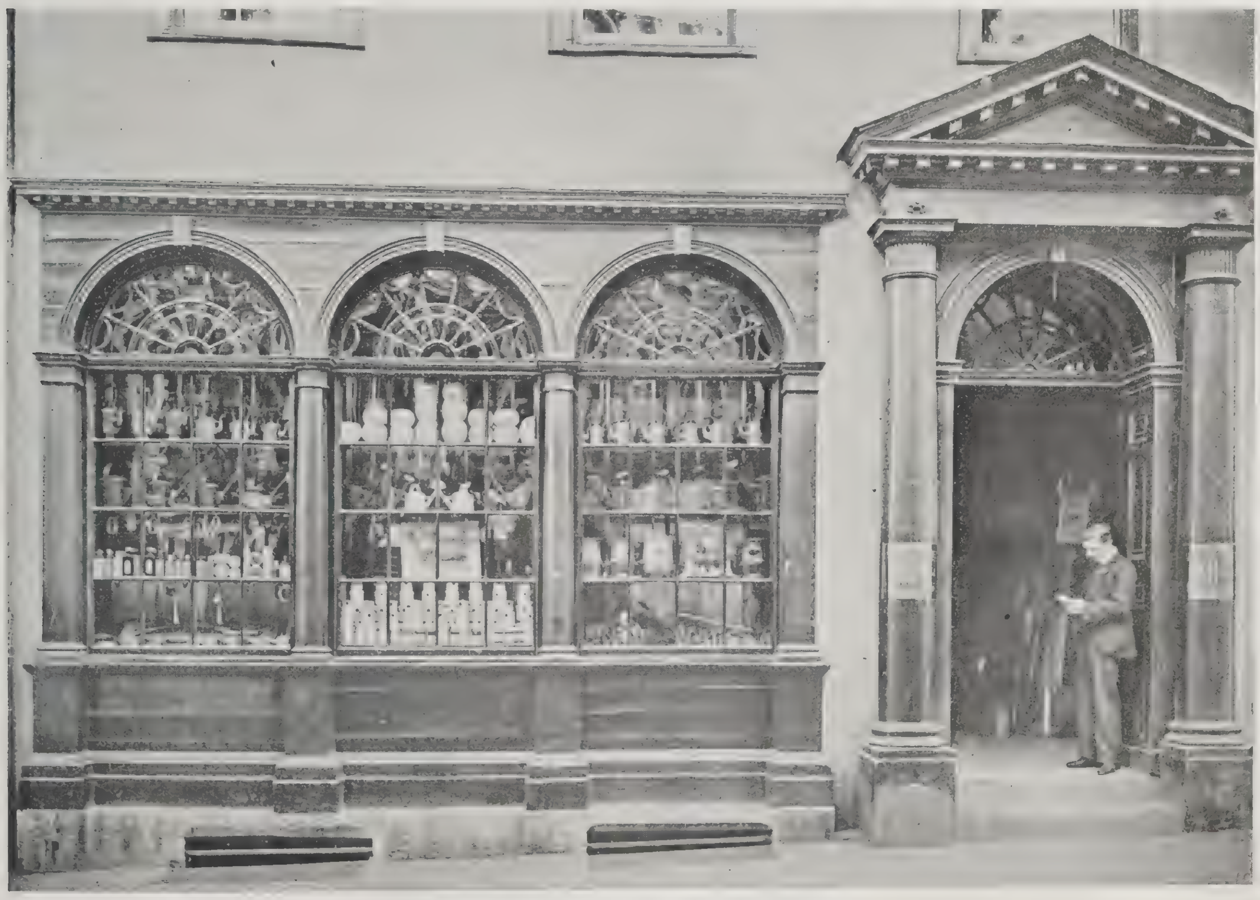
# Old English Shop Fronts

By JOHN TAYLOR BOYD, JR.

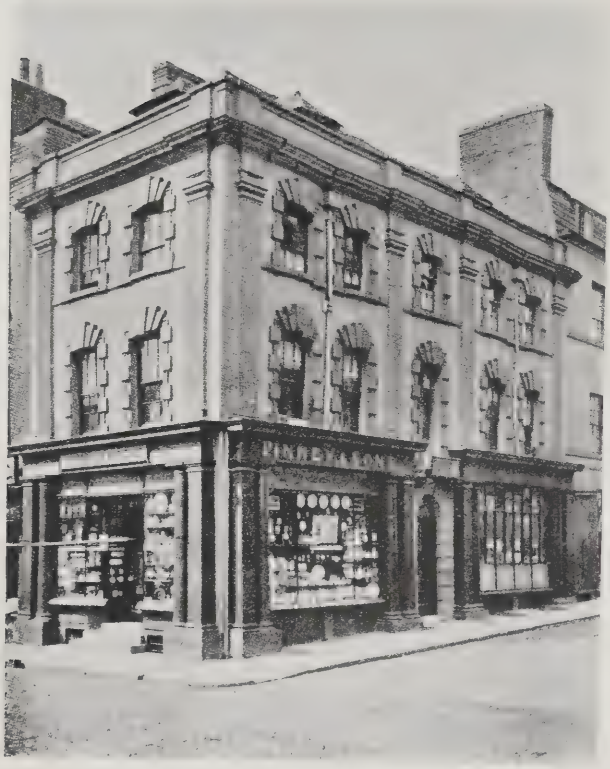
THE retail shop front is the legitimate child of Main Street. Its character is much the same throughout the country,—usually a small, intimate, and unconventional bit of architecture, its scale very small and domestic in character in contrast to the big proportions of the monumental business buildings in the large cities. In only a very few fashionable shopping centers, such as the Fifth Avenue district of New York, does the small shop express that air of luxurious worldliness which distinguishes the finest of the Paris shops in the neighborhood of the *Rue de la Paix*.

Since the shop front is really a type of the architecture of the small town, the designer of today will find much inspiration in historic English architecture, which is so preëminently an architecture of the small town, domestic in character and scale. He will find the type of small shop front fully developed by the time of the eighteenth century, when there were built many examples of the charming and beautifully rendered symbols of the ideal. They form a tradition which still has vitality today. Its modern significance is not a matter of perfunctory copying, but is founded on more solid ground, namely—imaginative design, perfection of scale, and the direct, common sense use of materials, on the architectural side; and on the practical side, the similar character of the small shop to those of today, with the same structural essentials. It may, therefore, be worth while to trace briefly some of these points of resemblance between old shops and new.

Although the English shop front evidently first became widespread in the eighteenth century, an earlier ancestry is suggested in the mediæval town houses, such as may occasionally be seen in England, notably a fine old row along one of the streets of Chester. The houses are four or five stories high, generally of half-timber construction, located on narrow, deep lots—a custom which still obtains—and fronting on narrow streets, often no wider than alleys. This ancient half-timber construction easily allows the introduction of the shop front. The framed timber skeleton, with its heavy supports spaced wide, the intervals filled with large windows having light enframements and slender mullions or with panels of brick or clay and rushes plastered with stucco—is this structure so different from our buildings of today, except that we now use iron in place of oak, and are more likely (though not certain) to encase the structure with various materials



Part of the Facade of a Shop at Lewes

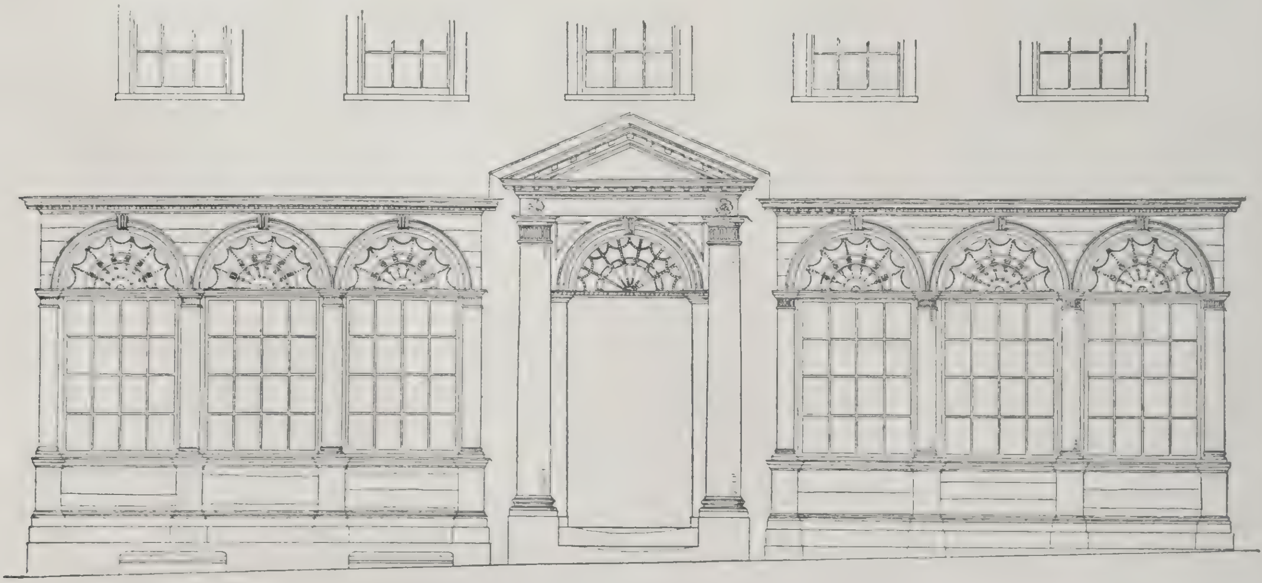


A Corner Shop at Cirencester

of finish, in metals, masonry, ashlar or marble veneer? However, notwithstanding this favorable architectural setting, it is likely that the turbulent social conditions of the Gothic towns, whose narrow streets were badly paved and poorly policed, deterred the burghers and craftsmen from displaying their wares too freely on the ground floors of their stores and workshops. But as the towns grew more settled, and were better planned, with wide streets, well paved and having sidewalks, the shop front came into its own under architectural and business conditions similar to those which are obtaining today.

The modern shop front is more varied than the older English prototype, because we have more kinds of shops in order to sell the greater variety of goods furnished by our material civilization. For this reason the English type is strictly defined, but nevertheless one allowing great originality and freedom of design within the type. Usually it is a simple flat screen of small glass panes thrown across the entire front of the building on the ground floor, often with a center door, the screen enframed with a slender architectural motif of wood. In some cases the doorway is merely an opening in the screen of panes, and, with glazed panels and transom above and slender strips of pilasters or mullions, is designed to break up the expanse of glass as little as possible. In other cases the doorway becomes a distinct feature of the design, with conventional architectural treatment, separate from the show windows on either side. Although the door was usually in the same plane as the screen of glass, sometimes it was recessed forming a tiny front vestibule, as in the case of the shop at Guilford, where the heavy carving around the arch continued as a broad band under the show windows, gives a design of unusual breadth and richness.

These illustrations show a variety of architectural treatments of the type, ranging from extremely simple designs—hardly architectural at all except for their fine proportions and scale—to the more sophisticated design of the shop at Lewes. In this latter the triple division into architectural doorway and flanking show windows, separated by wall piers, the tying together of the three divisions by the use of seven arches of approximately equal size and proportions and by transoms of the same decorative pattern, all characterize a highly coördinated architectural design. Another shop, at Cirencester, has a fine emphasis of the show windows by reason of the enframement of paired columns and entablature, as compared with the shop at Lewes. This emphasis

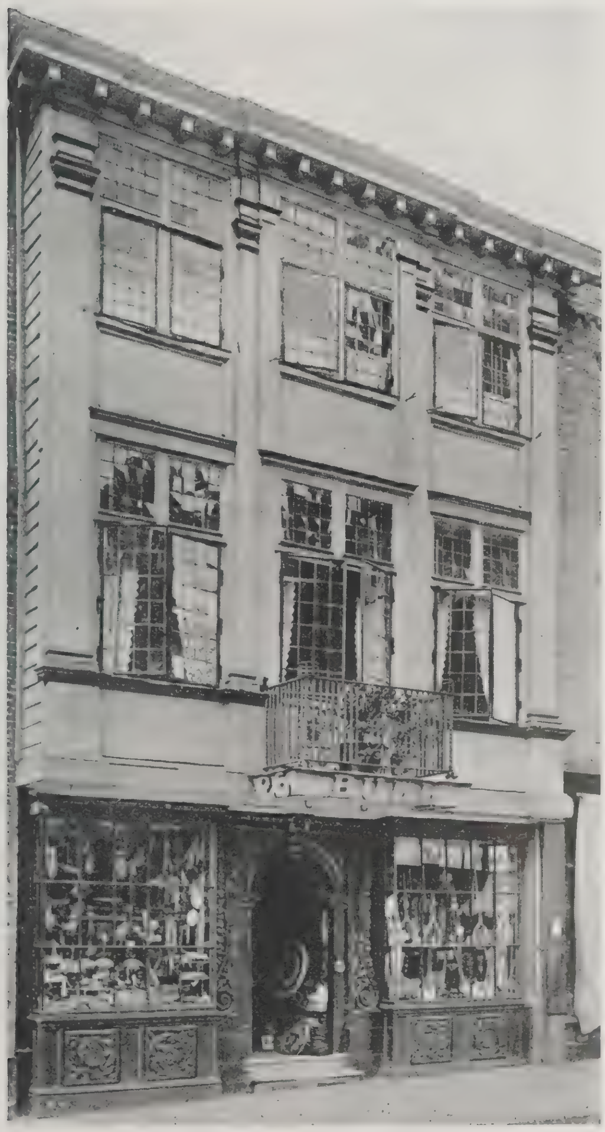


Detailed Drawing of Shop Front at Lewes

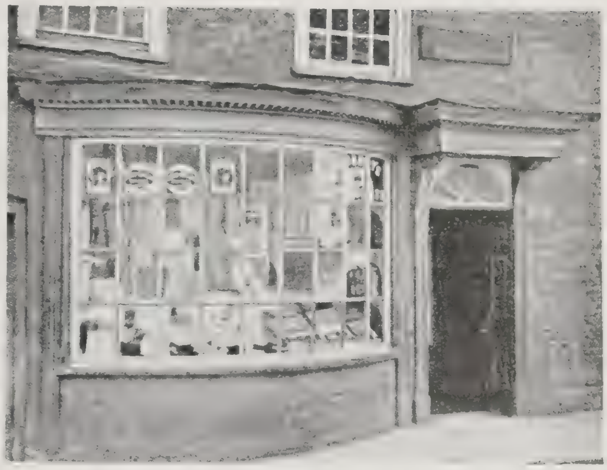
of the display window would appeal to the salesman.

Midway between these highly complex designs and the extreme simplicity of certain other shops is the shop front at Bath. In this example the door is an integral part of the glazed screen, and the screen itself is enframed by a light and very delicately proportioned motif of architecture. Many interesting variations of this scheme are seen, charming indeed in their wood details of tiny pilasters, columns, entablatures and decorative patterns of transom and fanlight, Georgian in style, with those attenuated proportions so familiar to us in our own Early American architecture. One motif particularly admired is the shallow curved bay window. It occurs often and always to good effect, as in the shops at Bath, Dorking and Wareham,—especially in the latter, where the whole front bows out in a fine wide sweep, contrasted against the single doorway at one side of the small but graceful facade.

It is interesting to note in how many points these English designs resemble modern examples. Just as today, the designer in many cases gave little thought to the relation of the shop front itself to the building above. Often it is clearly a case of an alteration to an older building, of the shop forced ruthlessly into a design not suited to it. The shop at Montpellier shows the unusual case of the shop front's forming an integral part of the design of the whole building, there being large rectangular openings between piers decorated with caryatid figures, which come under the columns of the order of the story above. This design recalls some of the best of the recent shop buildings on Fifth Avenue. At the other extreme is the shop at Guildford in which the pilasters of the wall of the upper story have apparently nothing to support them but a flat screen of glass. This again is entirely "modern," and its most flagrant example is a new building on Madison Avenue, New York, in which heavy stone free-standing columns—not light stucco pilasters—rest on a sheet of plate glass. To this structure the Fifth Avenue Association awarded this year its annual prize! It is an extreme example of its kind.



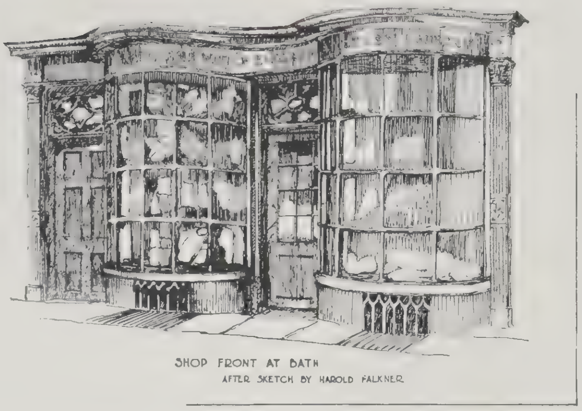
Old Shop Front at Guildford, Kent



Bowed Front, Wareham, Dorset

To what extent will the tradition set by these older English shop fronts answer the needs of today? This is a pertinent question for the designer who is seeking ideas and inspiration and who will not copy details blindly. As far as the general character of these old fronts goes—their vivacity and charm and variety, their fine proportions and scale and vernacular style, their skillful use of building materials in design—they have qualities as valuable today as ever. They express the ideal of the small shop, particularly the shops of smaller towns and of our suburbs ranged along the inevitable Main Streets, most of which offer fields for missionary work.

But, as has already been said, the small retail shop is now in the twentieth century a thing of greater variety commercially, and it must reflect the more complex and more specialized character of the shop business. We must have a wider variety of types to correspond with our many kinds of stores, and we have a further opportunity for diversification of each type in our more abundant choice of building materials. Not only that, but our shopkeepers have

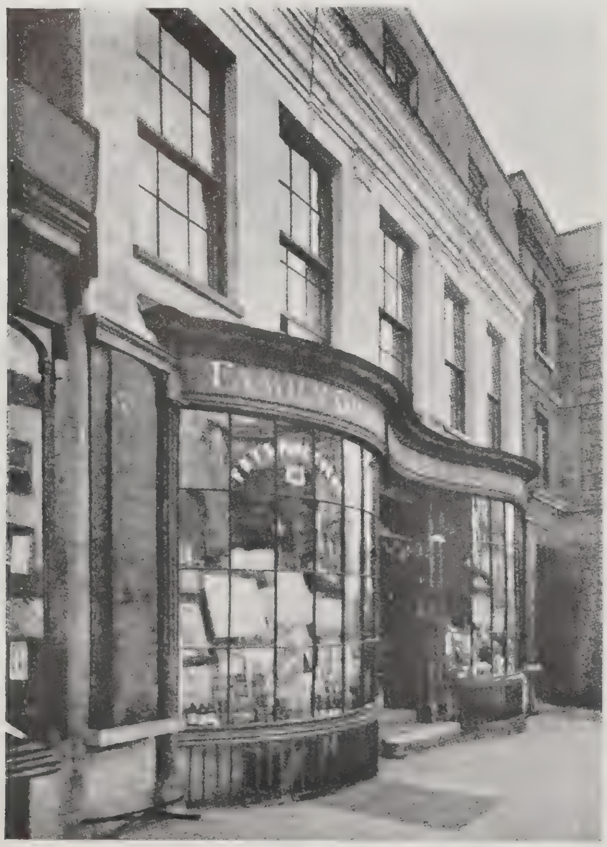

SHOP FRONT AT BATH
AFTER SKETCH BY HAROLD FALKNER

An Old Shop at Bath

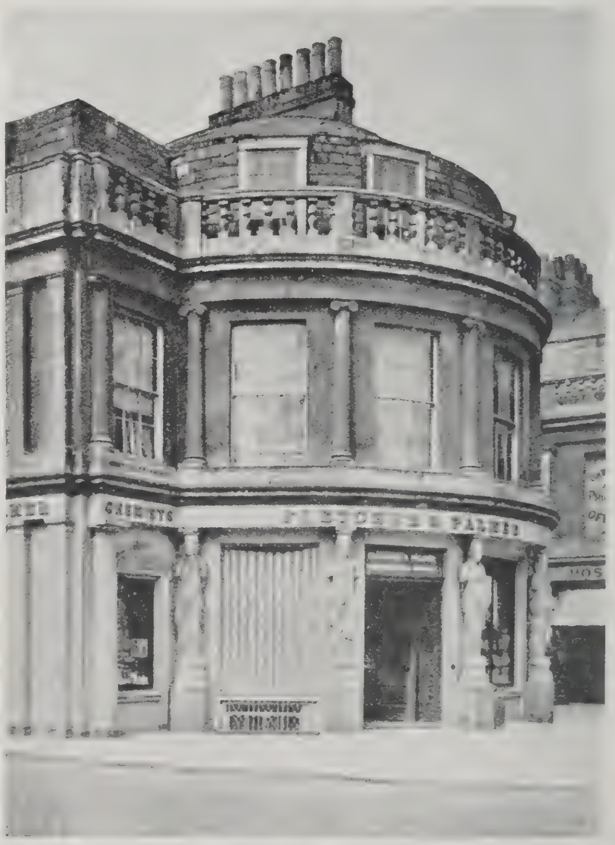
brought out a new idea,—new only since the World War,—one which in itself bids fair to open a new field in design. I refer to the custom of recessing the display front so as to provide not one or two show windows, but many more, a dozen or less, opening off a corridor or vestibule leading from the sidewalk into the store itself. Here the buying public may circulate and may view a large part of the tradesman's stock, excellently displayed, before entering the store to buy. This arrangement attracts the casual passer-by and it also saves the sales people's efforts. Architecturally, this change introduces a new conception. Instead of the screen across the front, we have an intricate series of parts. Design changes from two into three dimensions having endless possibilities.

To this architectural development into the third dimension are to be added modern conceptions of salesmanship, of "quantity production, rapid turnover, psychology of the prospect, sales push and sales pull," with the birth of the new minor art of show window display. The buying public is vastly increased, and it extends to all classes with every difference in taste. The modern salesman contributes many new ideas which should create a new series of motifs in design, expressing the variety of retail trade, of the public taste, and, more especially, the endless differences in size, shape, color and in scale, of the wares in the show windows. Today the architect must interpret imaginatively the ideas of the salesmen, in new motifs, patterns and ideas.

For these reasons I believe that shop front design is in its infancy. If the architect grasps the salesman's ideas and if he interprets them imaginatively, carrying them far beyond anything the salesman himself now conceives of, the architect will revolutionize the design of the small shop just as he has revolutionized every other type of building now in use. To that extent Main Street will be rescued from its present bleak, drab standardization. If in this promising development the architect can preserve the ideal of beautiful form and perfect taste symbolized in the historic English shop front, our shopping streets will be worthy of America.



"Double-bowed Front"; Dorking, Surrey



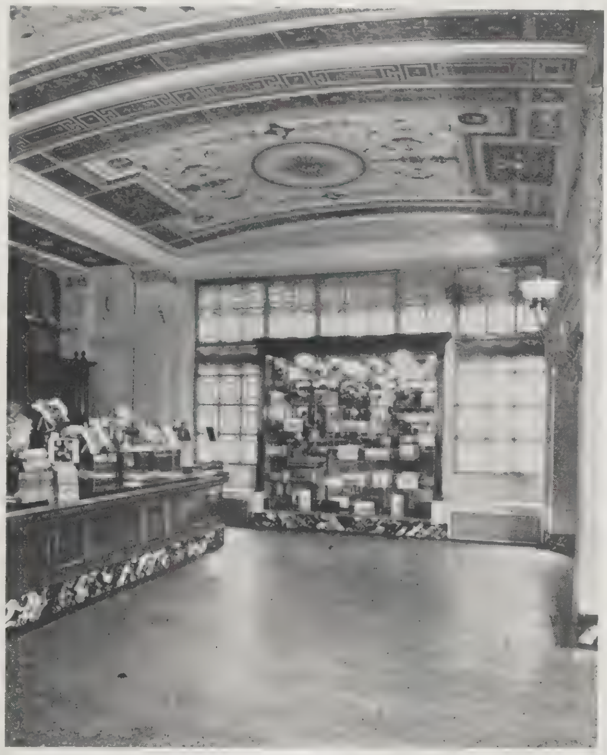
Montpellier, "Shop a Part of the Design"

# Decorative Treatment of the Schrafft Stores

CHARLES E. BIRGE

IT is not surprising that this group of Schrafft's stores is presented as an ideal type of modern candy stores and restaurants. The motto of the Frank G. Shattuck Company which is responsible for this remarkable group of stores, has always been "The best is none too good." This motto is consistently carried out not only in the materials used to produce the merchandise sold but also in every detail of construction, design and equipment of its several shops and restaurants. No money has been spared to make the interiors as well as the exteriors of all these shops as artistically beautiful, practical, and commodious as possible. Appropriateness as well as variety of design marks the interior decoration. In the smaller shops simple artistic effects have been carried out, while in the larger and more pretentious shops and restaurants decorations of true magnificence have been successfully executed.

For instance, in the Schrafft's shop in Boston, combined with which is a spacious restaurant, the interior decorations are in Pompeian style; soft toned travertine walls and pilasters support a slightly vaulted ceiling which is richly decorated in highly colored designs of Roman origin. The black terrazzo-cloisonne floor with the high black and white marble sub-base gives a rich contrast with the splendor of the colored ceiling.

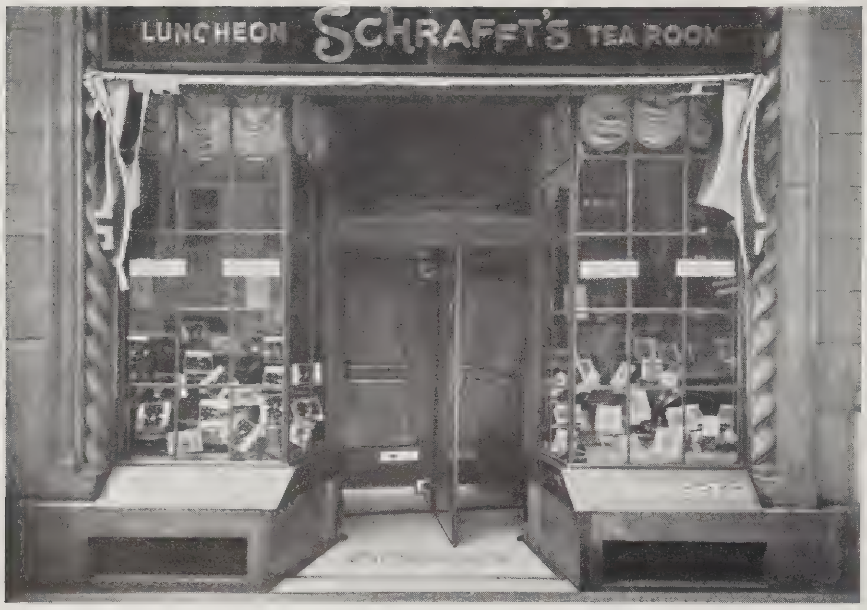


**Interior of Schrafft Store, Boston**
**Travertine walls; Pompeian ceiling**

In the candy shop at 383 Fifth Avenue, New York, another very rich interior has been evolved in tones of old gold relieved with red. The floor is of white marble with a black and gold base. This treatment of the floor is quite different from that employed in the more recently constructed shops. The walls are divided by pilasters into broad panels where are placed paintings in Italian arabesque, the frames of which together with the heavy cornice and ceiling mouldings are decorated in polychrome. In pleasing contrast with the richly decorated candy shop the tea room at the rear is in the Colonial style. The walls are paneled in painted wood of a deep ivory color. An ornamental stairway, which is the chief decorative feature, leads up to a tea room on the second floor, the walls of which are decorated in panels of gray silk. An interesting experiment was tried in the lighting by the use of one very large porcelain vase placed in the center of the shop from which powerful indirect light is thrown upon the ceiling. All of the counters and showcases as well as the wall panels of the candy shop are of Circassian walnut embellished in gold. Decorative paintings set in the vertical panels between the marble pilasters add great richness to the treatment of the walls. Another unusual feature is the use of very beautiful bronze vases for the soda water fountains.

In the little candy shop at 20 West 38th Street, a simple decorative treatment, Georgian in style, has been attractively carried out in gray and gold. Here again the walls are divided into panels in which at various intervals are set mirrors with dull gilt frames having above them decorative panels of flowers and fruit. This shop has a mosaic floor and simple furnishings. In the tea room on the second floor, which is decorated in gray and old rose, alcoves arranged along the sides give privacy for little parties. The walls are relieved by elaborate mirrors in the Italian style, which give dignity and character to the whole interior of this tea room.

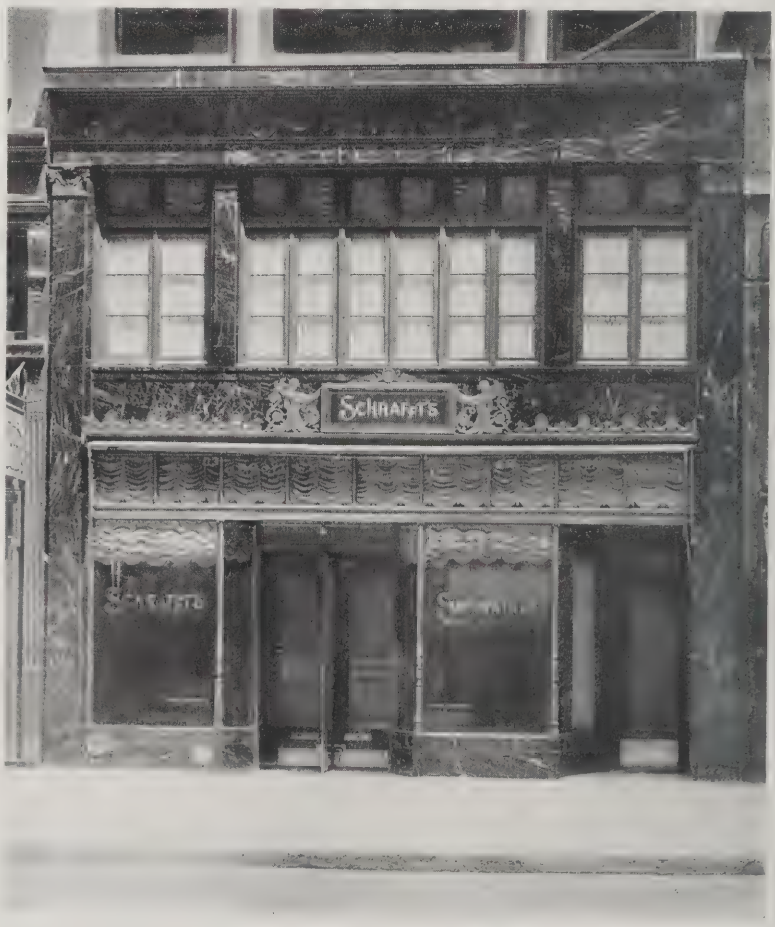
In the candy shop and restaurant completed a year or so ago at 13 East 42nd Street a more ornate type of decorative treatment has been followed. The black terrazzo-cloisonne floor gives a deep base for the lighter toned walls and rich ceiling. Suggesting an Italian effect, the walls have been built of travertine in pilasters and panels which carry a ceiling of plaster beams and panels, painted in imitation of walnut and decorated with polychrome application and design, with elaborate patterns stenciled in gold on the intervening ceiling surfaces between the beams. The northern half of this shop at the 43rd Street end is at a lower level, making it possible to



Exterior, Candy Shop and Restaurant, 50 Broad Street, New York

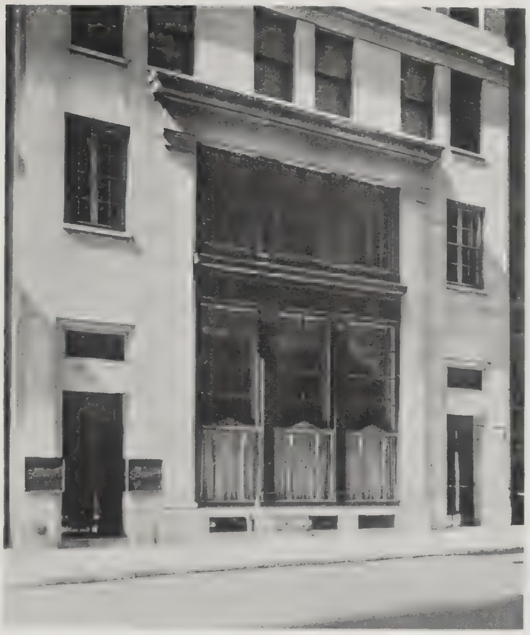
have a much higher ceiling and more impressive treatment. The same Italian scheme of decoration has been used, but the recessed walls have been filled and ornamented by elaborate wrought iron framed mirrors. The height of this restaurant permits the introduction of a mezzanine gallery which has an effective wrought iron railing. The ceiling of this two-story restaurant is treated in an even more ornate rendering of the Italian style. The ceiling beams, which are massive, are supported on high ornamental consoles. The mezzanine gallery, which continues through the entire second story of this shop, is paneled in wood painted soft green and detailed after the Colonial style. The floors are terrazzo as are those below, and the space has been arranged so that part of the tea room is divided into alcoves for the purpose of privacy. This store has a third floor on which is located a men's grill, finished in American walnut in the Georgian style. Continuous benches line the walls in place of alcoves. Heather brown quarry tile are here used for the flooring material. The ceiling above the walnut paneled walls is treated in low beams without decoration. The design of the exterior of this store on East 42nd Street, which is typical of all the later Schrafft stores, shows a pleasing combination of black and gold marble pilasters combined with bronze for the bases, caps and other decorative detail finished in an antique gold color. The whole design is suggestive of the Italian Renaissance, which seems to be the prevailing precedent for the decoration of recent stores built for the Frank G. Shattuck Company. The East 42nd Street facade of this store shows a large window running up two stories surmounted by a fine cornice. Again black marble combined with bronze details has been used for the architectural treatment. Fine bronze rosettes enrich the marble frieze of this facade, and beautifully executed bronze detail gives scale and interest to the large window.

At 141 West 42nd Street a new building for this company has just been completed. Although somewhat similar in plan and design to the shop at 13 East 42nd Street, and running through to 43rd Street as does this other shop, yet the interior has been carried out in an even richer and more elaborate decorative scheme. The treatment of the candy shop which is at the 42nd Street end of the building includes a floor of black terrazzo-cloisonne. All of the woodwork, showcases and counters are executed in American walnut.



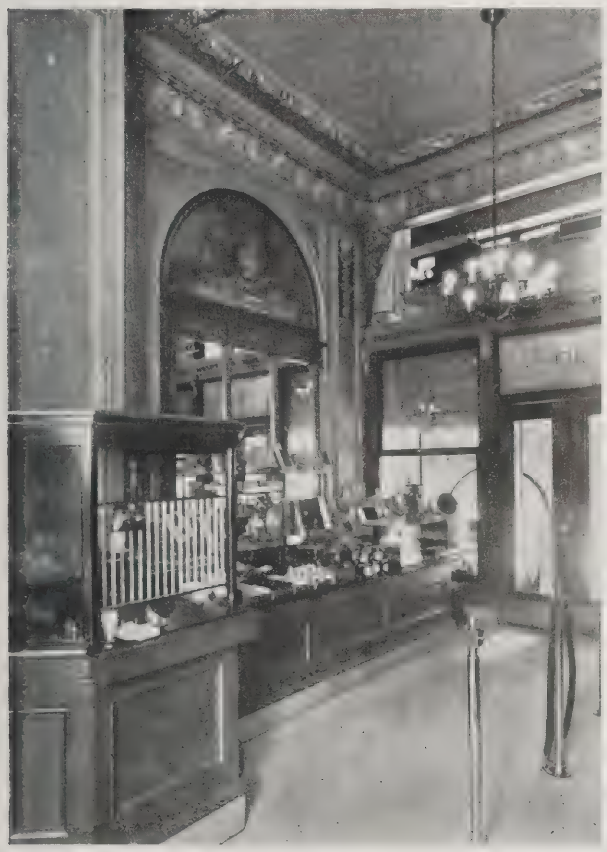
141 West 42nd Street, New York

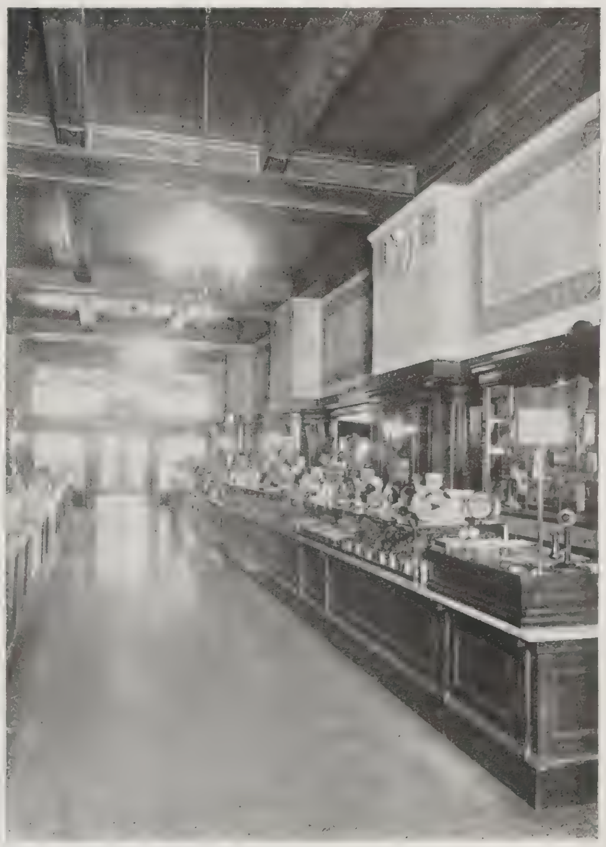
The Italian style of decoration has been carried out in the travertine panels and fluted pilasters of the walls and in the low relief of the ceiling ornamentation in which the principal panels have been painted in Italian arabesque. This same treatment has been carried through the entire ground floor to the 43rd Street end of the building, where is located the restaurant. This room is carried up two stories and is treated with an ornamental mezzanine gallery and monumental staircase. Large mirrors have been set into the wall panels of the restaurant to give an effect of added space. In the mezzanine restaurant alcoves with benches executed in walnut have been built in along each wall. The decorative features of this restaurant correspond in general to those of the one-story candy shop at the 42nd Street end. The ceiling of the high two-story restaurant on 43rd Street is effectively treated with large coffered arches and groined vaulting elaborately painted in Italian polychromed arabesques.


"Suggestive of the Italian Renaissance"

One large window two stories in height, looking out on 43rd Street, lights this restaurant and the mezzanine. The entire wall treatment is carried out in travertine relieved with decorations in Italian red. In the main part of the store travertine is also used, with wall panels embellished in gold and colors. In the lunettes over the two large doorways of the restaurant marble busts have been effectively introduced. As in the candy shop, the floor here is black terrazzo-cloisonne. On the third floor is another restaurant finished in the Georgian style, with the ceiling of plaster simply paneled and decorated with antique gold borders, and the walls of paneled and painted wood.

From these very brief descriptions and the illustrations of several of the New York Schrafft's stores, it is possible to appreciate the amount of care and study which has been employed in designing the richest and most effective architectural and decorative treatments possible for shops of this character.


One End of Candy Shop


Candy and Soda Counters

# The Hanan Shoe Stores

*By* A. D. SEYMOUR, JR.

IN designing the various shoe stores for Hanan & Son the idea constantly kept in mind has been their practical and commercial use rather than their architectural effect. These shops are in existence primarily to retail a high grade shoe, and as such is their purpose it follows that they must be so planned that they will fulfill this function in the most efficient manner.

There is of course a certain advertising value to such a concern in having its various shops resemble each other, but where their situation varies as regards location in different cities, some modification in their layout is necessary. In the case of the shops in the restricted Fifth Avenue district, where a women's retail trade is catered to, the shops are designed especially for this type of trade. If the situation is, for example, on Broadway or any other street where the retailer finds mixed buyers, then the shop takes on a more commercial air, and quick service, seating and stock capacity are considered of chief importance.

Rather than employing a particular style or period design in the interior decoration of these stores, it has been deemed more appropriate to keep them modern in all respects, using the best of materials and construction. No attempt has been made to design an Adam, Louis XVI or Italian interior, nor has any attempt been made to conceal the purpose of the shop by removing the shoe boxes from the salesroom. While the period style shop has been avoided, there has always been careful thought given to the solution of the practical elements entering into the modern merchandising of shoes, such as window display, stock shelving, seating, hosiery display, lighting effects, offices and packing facilities. Special types of rolling ladders and mezzanine balconies have been installed, and where the shop is not of too commercial a character, due to its situation, special tables with chairs have superseded the long settees or benches. In some cases a semi-public or domestic character has been carried out in the design where the customers are principally women.

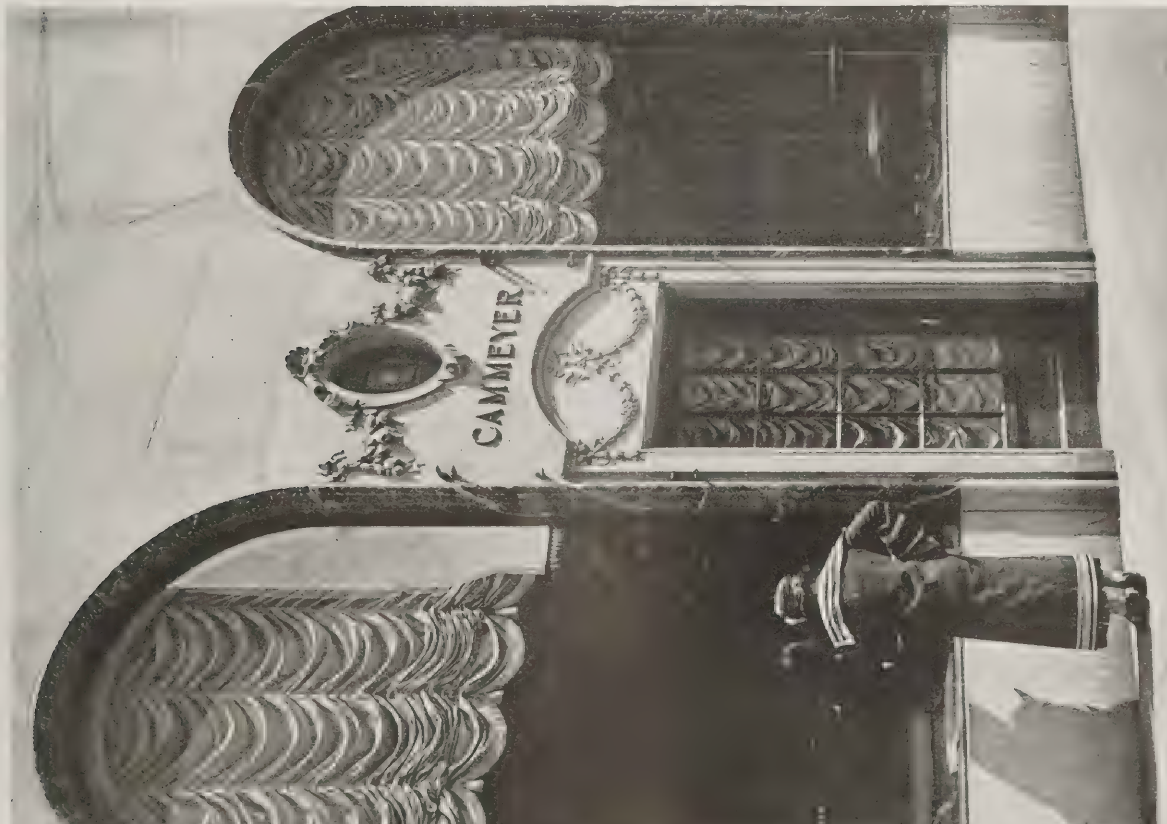
It has been found by a number of experiments that the show windows should average about 24 inches from the ground for the best display of fine shoes, and that a depth of 4½ to 5 feet allows a good system of window dressing for such small articles as shoes and slippers. A plate glass front of about 9 feet with a false ceiling at that height gives a pleasing proportion and permits good overhead window lighting. Special attention has been given to the type of window hangings and display tables in the windows, as well as the floors of the windows themselves, which in nearly all cases are plain walnut panels, set off with small ebony borders. Any height available above the line of the window deck is used as a transom which, with a corresponding set of interior transoms, makes it possible for the shops to have natural ventilation which in summer is desirable.

In the interiors of these stores a height of about 11 feet is all that can be readily handled from ladders, and the shops that require a larger stock on the sales floor employ mezzanine stock galleries, where the height allows of their use, which is the case in most ground floors in modern buildings. Where more than one floor is combined in the store, the men's department is always placed on the ground floor and the women's department on the second, with a good sized passenger elevator located near the main entrance and served by a lobby, which enables the women to reach their sales floor without passing through the men's department.

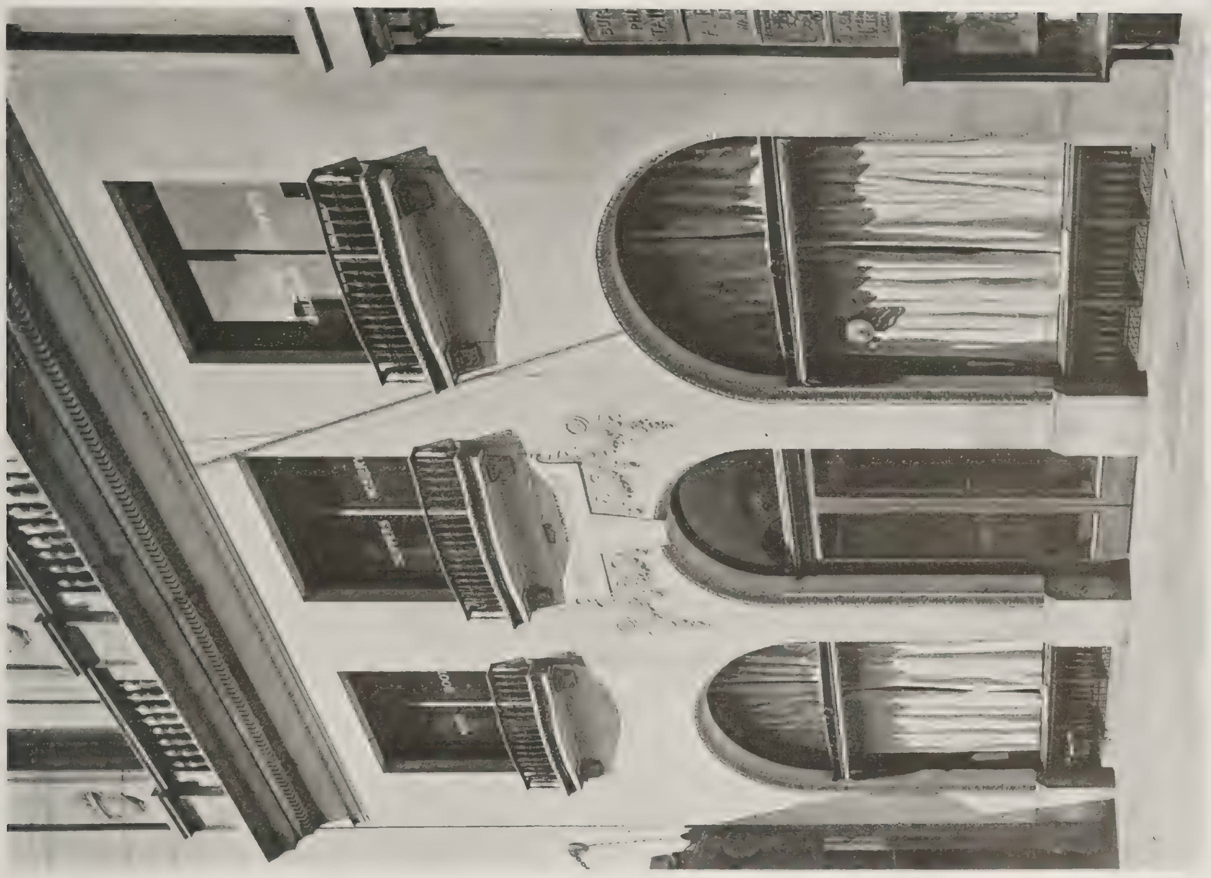
The display and sale of hosiery and shoe buckles have always been a feature of these shops, and special consideration has been given to the location and system of merchandising these items. In the shops catering almost exclusively to women, as for example the uptown Fifth Avenue shops, the hosiery display has been located in the center of the salesroom, where it is always visible to attract the customer, although generally this feature is located near the entrance, being passed by the possible purchaser on entering and on leaving the shop.

The lighting of the show windows and hosiery show cases, while always ample in quantity, is concealed from the eye. In cases of corner windows this necessitates using louvers in the overhead window lighting. The surplus stock is usually shelved in the basement and distributed to the various sales floors by means of dumbwaiters. The wrapping of shoes for delivery is taken care of in the rear of the shops, service to this department being by means of doors at the rear of the salesrooms.

The exterior treatment of the Hanan stores in most cases is dictated by the practical consideration of the problems already mentioned, such as show windows, transoms and entrances. Here again a modern commercial character is sought as the best expression for the architectural treatment of the front. Kalamein bronze frames and cornices used in conjunction with certain ornamental cast bronze members comprise the first floor exterior treatment. Where bronze is employed marble is also introduced as the base upon which the front rests, and the remainder of the exterior is either limestone, terra cotta or marble, depending on the relative importance of the shop, due to its location and the length of its lease. The name of the concern is in most cases displayed in classic bronze letters, and all ostentatious advertising by means of electric signs or large name plates is avoided. This idea of restraint might be considered the underlying characteristic of all these shops as expressed in their various elements, where quality of material is the main consideration.



A RECENT FIFTH AVENUE SHOE SHOP
ROUSE & GOLDSTONE, ARCHITECTS



SHOE SHOP OF FRANK BROTHERS, NEW YORK
ALFRED FREEMAN, ARCHITECT

## SHOP OF FRANK BROTHERS NEW YORK

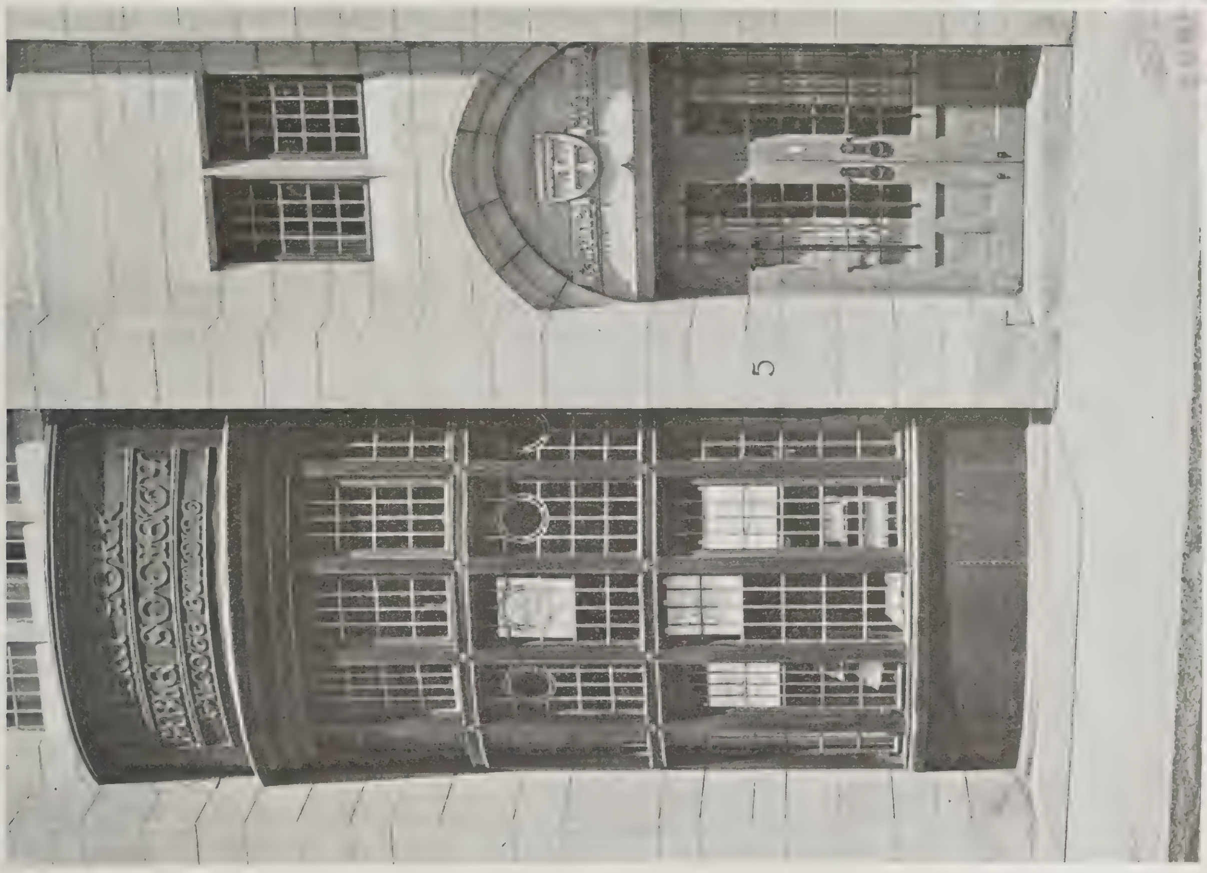
Upper Illustration, Plate 89

Straightforward and simple in conception, the design of this shop speaks for itself. The architectural treatment of the lower floor is well adapted to the purpose of display windows and entrance. While not at all unusual, the design has been carried out with such refinement of wall surface, such delicacy of carved detail and such restraint in execution that a result has been obtained deserving of much appreciative consideration.

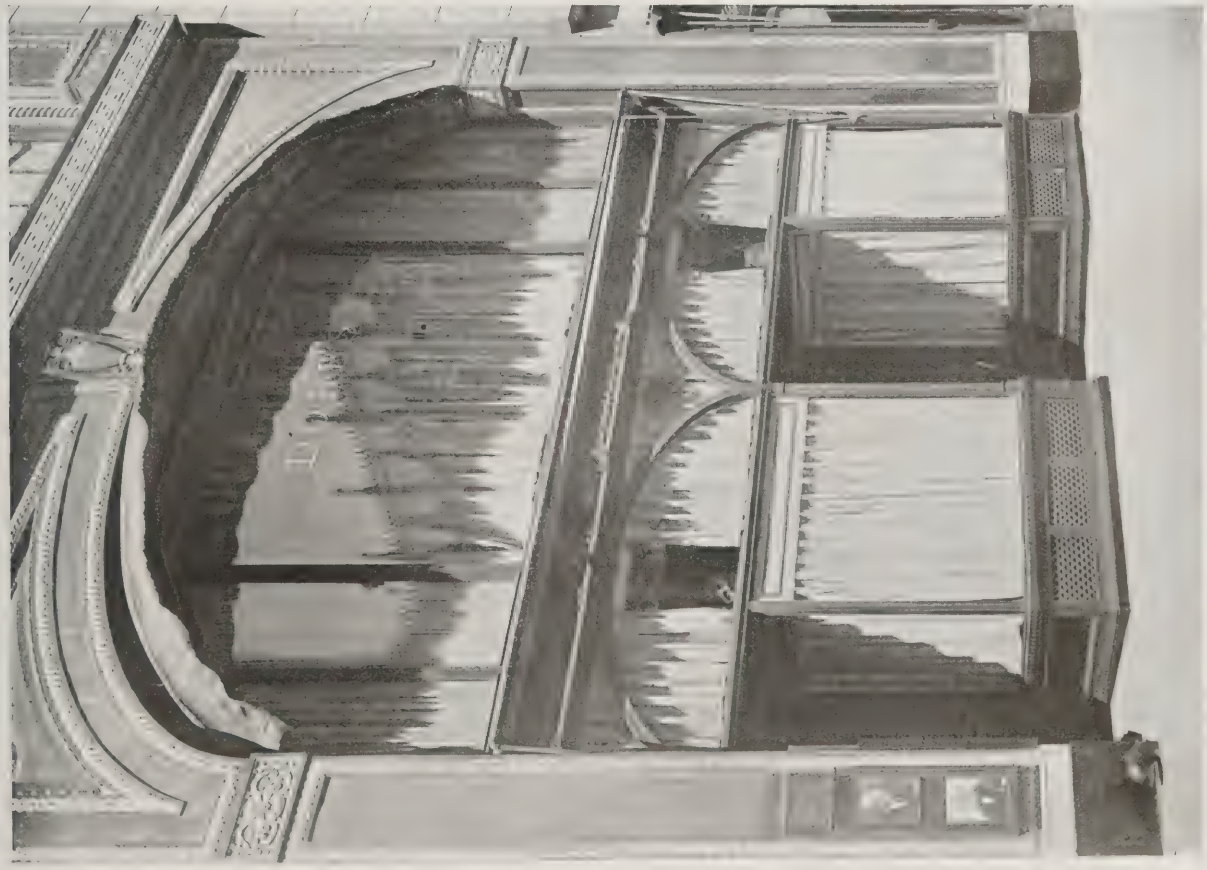
## CAMMEYER, NEW YORK

Lower Illustration, Plate 89

In this illustration only one-half of this store front is shown, but this single motif is sufficient to indicate the dignity and restraint of the composition. Perhaps the arches of the show windows could have been slightly narrower in order to give more masonry strength on either side of the entrance door, but the design as a whole shows a pleasing compromise between architecture and commercial necessity. The well proportioned arch windows are enframed by heavy black and white marble mouldings of simple contour. In contrast to the strength of these mouldings, carving in high relief suggestive of Grinling Gibbon has been introduced. Unfortunately there is little scale in the design, since only in the entrance door was the architect allowed to use small panes of glass.



SHOW WINDOW OF THE NEW YORK BIBLE SOCIETY BUILDING
WILFRED E. ANTHONY, ARCHITECT



A TWO-STORY SHOP FACADE
McKIM, MEAD & WHITE, ARCHITECTS

## NEW YORK BIBLE SOCIETY BUILDING, NEW YORK

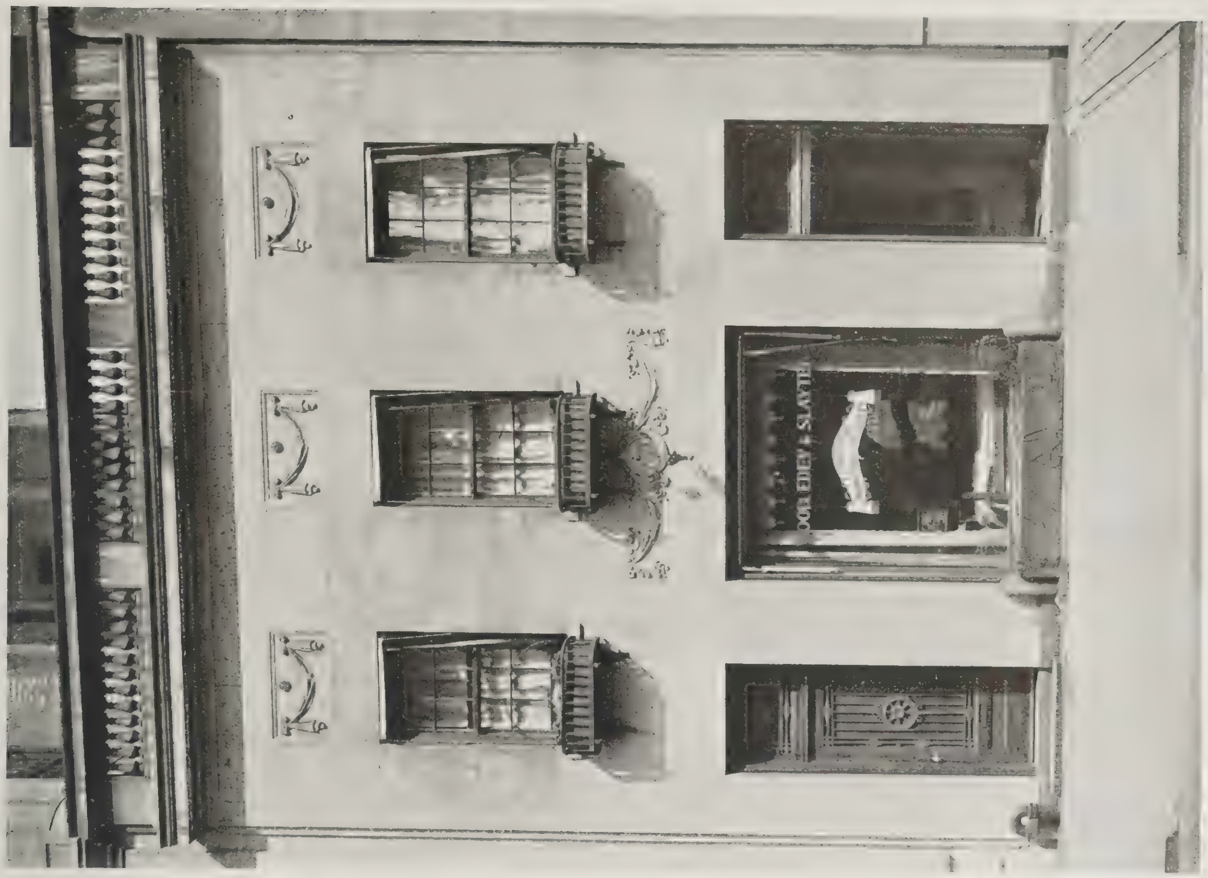
Upper Illustration, Plate 90

Reminiscent of old English shop fronts, this show window for the New York Bible Society combined with the well studied entrance door is one of the best designs of recent execution. The bowed plan of the window as well as its unusual height gives appropriateness to its location between two of the heavy upright stone piers of the tall building which rises above it. The window itself is kept in good scale by dividing it into three tiers of openings filled in with small leaded panes. The same sized panes are used in the openings of the double doors and the mullioned window above, tying together all the openings in one scale.

## SHOP OF DOBBS & CO. NEW YORK

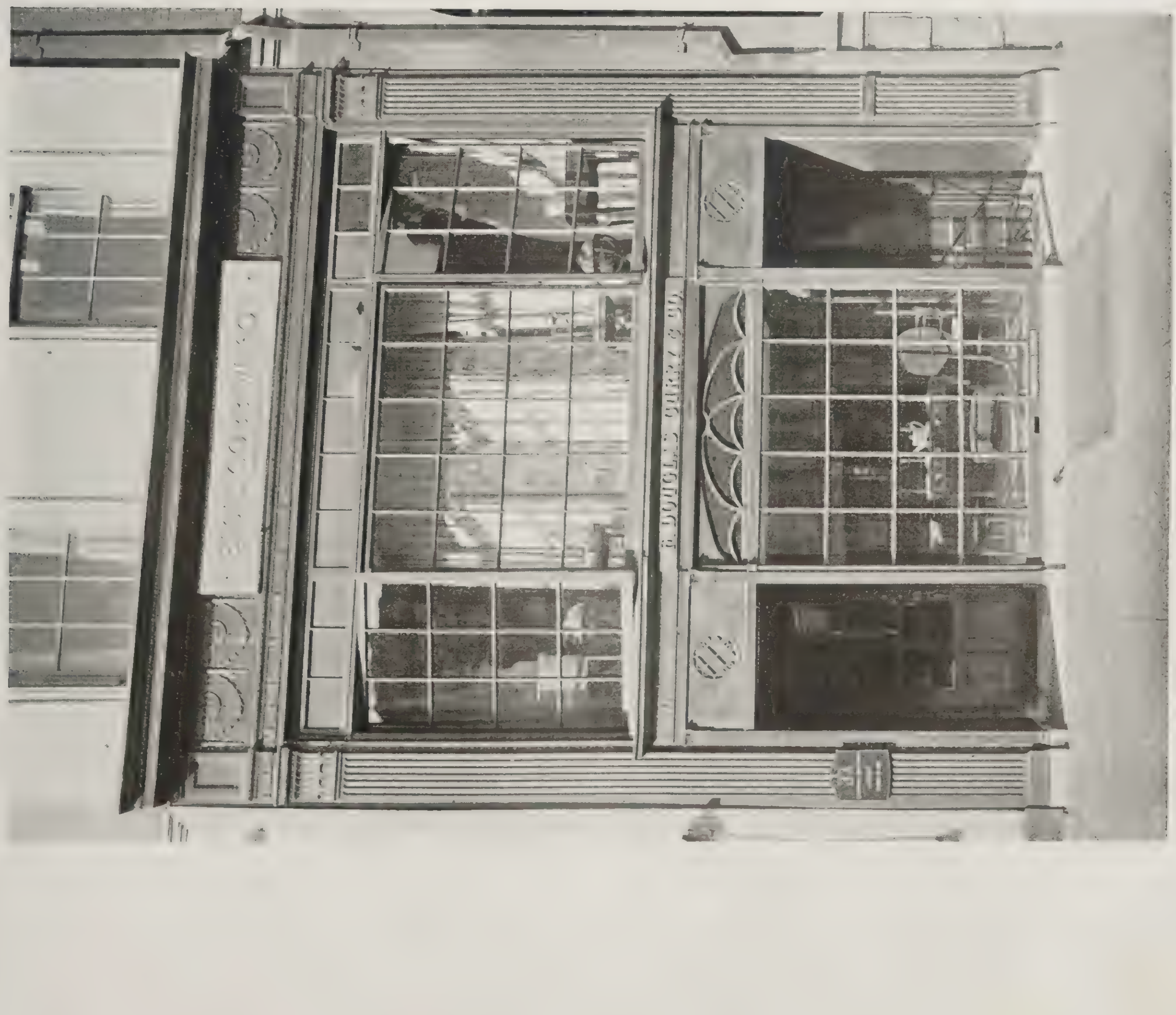
Lower Illustration, Plate 90

620 Fifth Avenue shows perhaps the finest example of the modern type of shop front to be found. This design shows a masterly combination of architectural terra cotta and marble detail with bronze framework. The design satisfies the requirements of the average shopkeeper who insists that as much of the front of his shop as possible shall be plate glass for extensive display windows. The entire front is one large arch composed of pilaster panels of dark gray marble enframed with richly colored terra cotta mouldings, plinth blocks, and a very ornate keystone. The bronzework of the windows, entrance and sign frieze is extremely delicate in detail and execution. The unusual charm of scale found in this design is largely due to the intelligent architectural handling of the slender bronze framework.



A LITTLE BUILDING FOR A FIRM OF INTERIOR DECORATORS

CROSS & CROSS, ARCHITECTS



A TWO-STORY SHOP FRONT IN ENGLISH STYLE

ELSIE COBB WILSON, DESIGNER

## WOOD, EDEY & SLAYTER
## NEW YORK

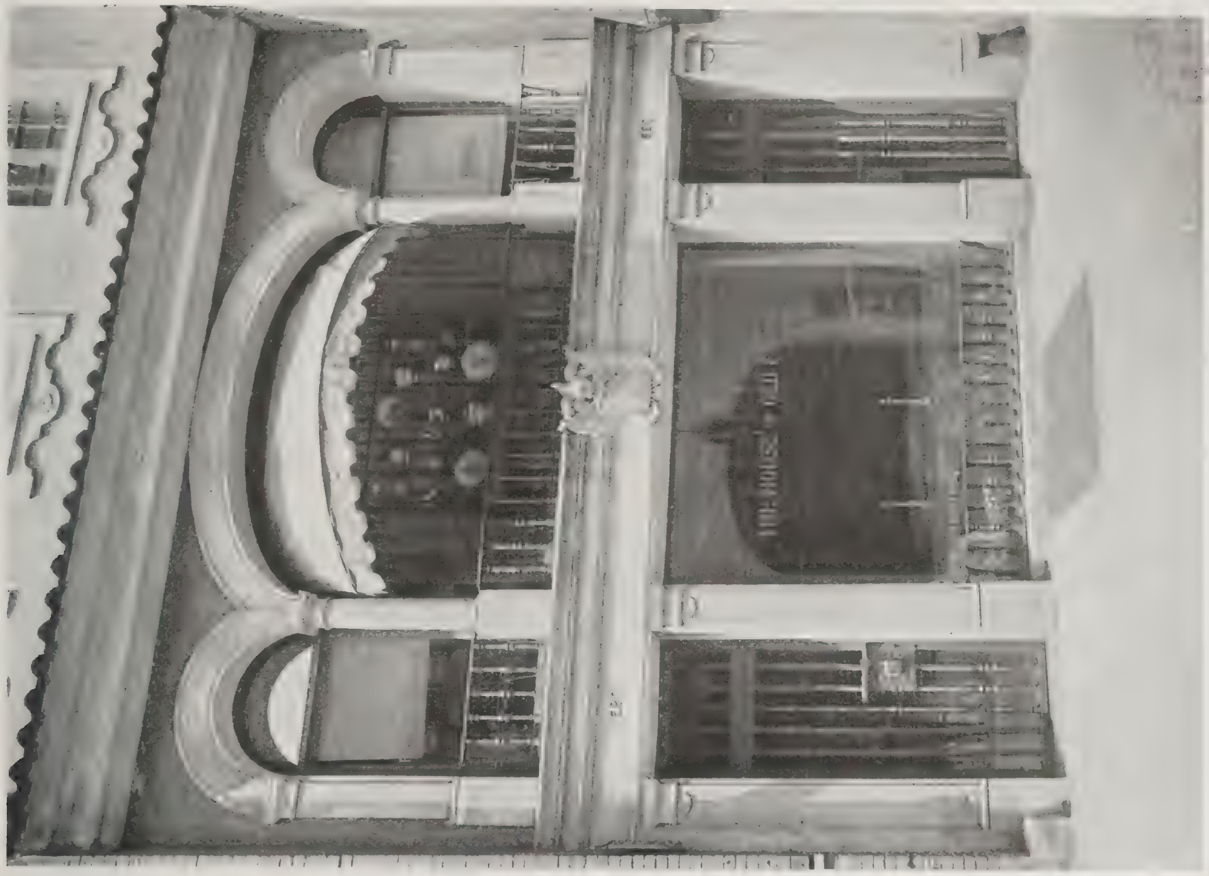
Upper Illustration, Plate 91

This little building, designed for the shop of an interior decorator, shows a pleasing simplicity and restraint in design. It is unfortunate that the space apparently required for the central show window should have necessitated placing the two doorways out of line with the windows above. However, the carved design in low relief above the show window serves as a note of division between the upper and lower parts of the design. What carved detail there is has been carried out in the style of the Adam brothers, and the small flower box balconies in front of each window further suggest English precedent. Small panes of glass in the show window would have better carried out the feeling of scale in the entire design, yet the small scale of the articles displayed, combined with the window draperies themselves, helps to save this show window from being a blank hole in the wall.

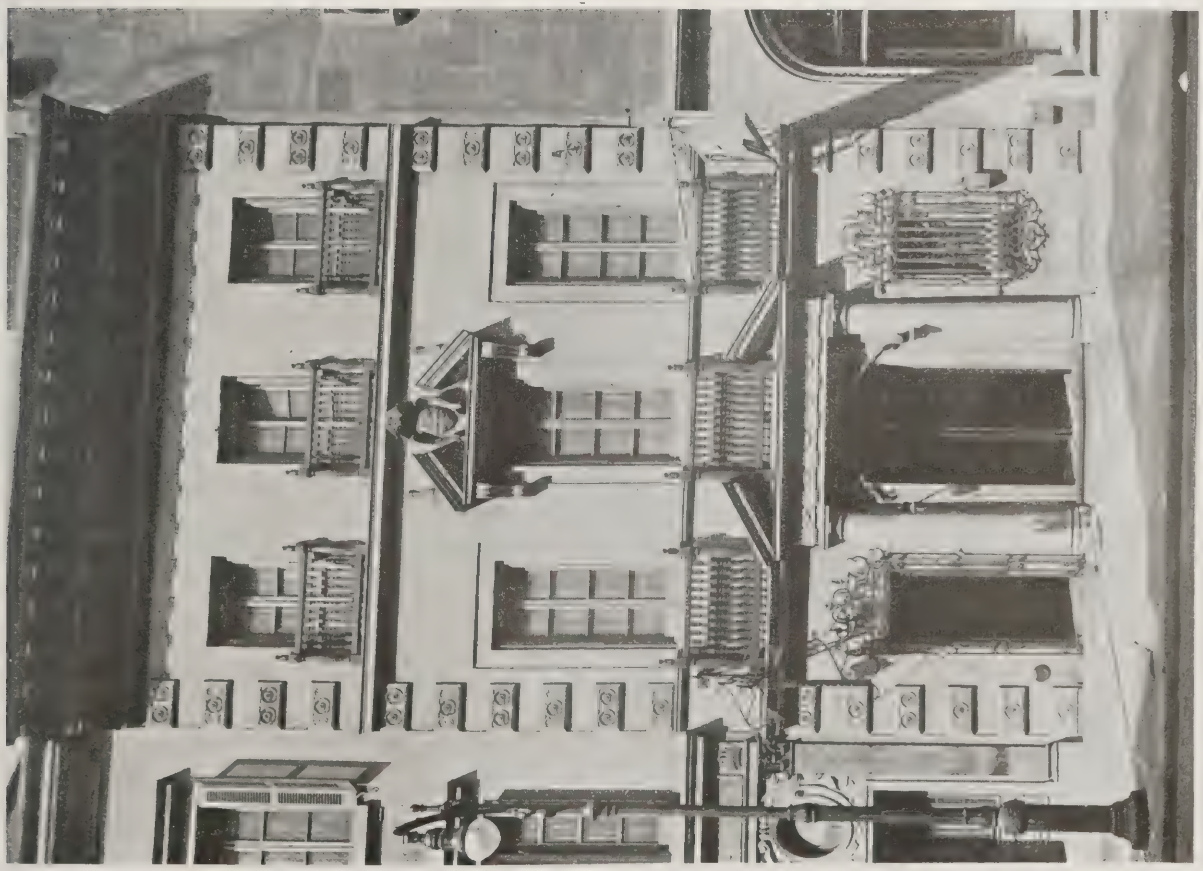
## SHOP OF ELSIE COBB WILSON, INC., NEW YORK

Lower Illustration, Plate 91

Perhaps the most attractive as well as successful shop front recently completed in New York is that of this two-story interior decorator's and antique shop. Inspired by the best English work of the Georgian period, this design is an example of good scale in both detail and arrangement. Although distinctly a two-story design, perfect cohesion has been obtained by the use of small panes of glass of uniform size in the windows of both floors, enframed by pilasters and a high entablature executed in Adam detail.



A TWO-STORY SHOP IN THE SPANISH STYLE
DAVID ASH, ARCHITECT



A STORE FRONT IN THE SPANISH STYLE
WILLIAM LAWRENCE BOTTOMLEY, ARCHITECT

## THE HOUSE OF OLD FABRICS NEW YORK

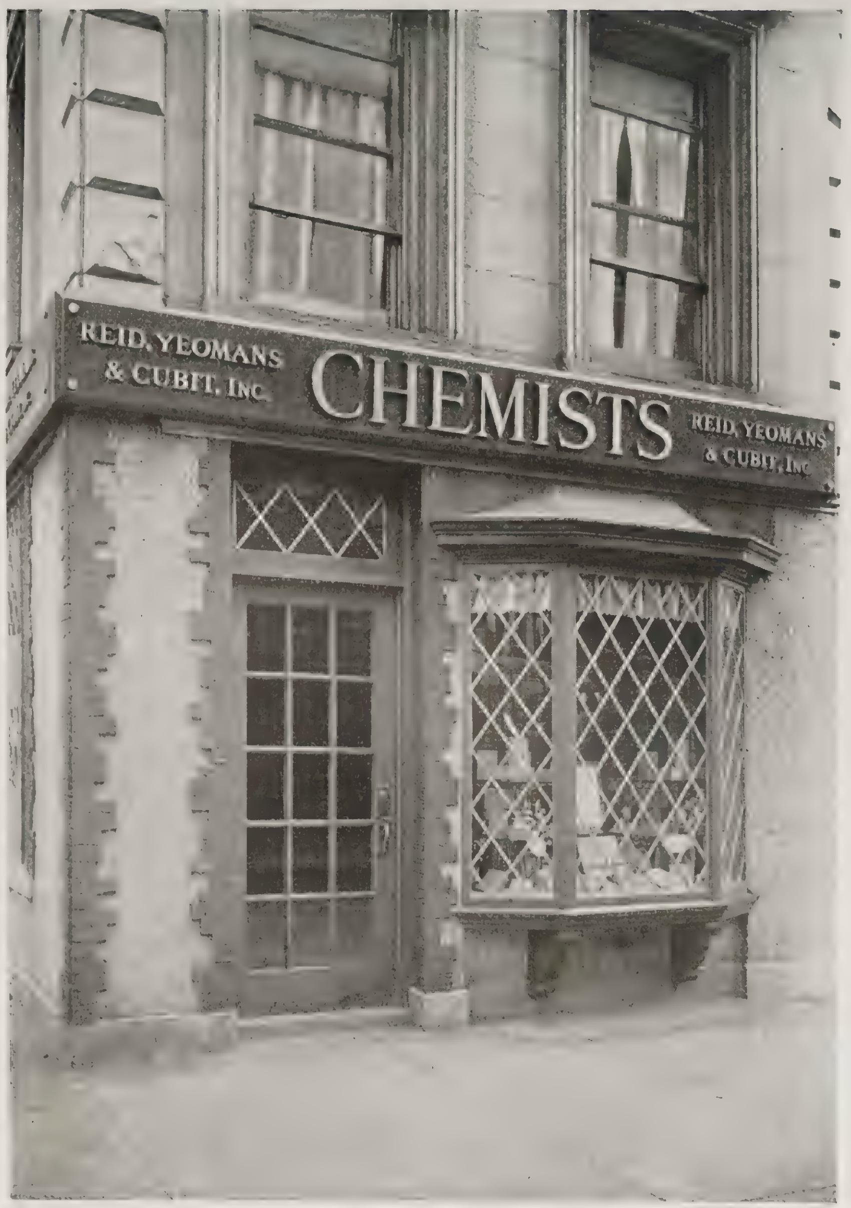
Upper Illustration, Plate 92

In "The House of Old Fabrics" a simple design in two stories has been carried out, suggestive of the Spanish Renaissance. A legitimate architectural motif in three arches over three openings has been made to adequately serve the requirements of commercialism. The spacing of the pilasters on the ground floor gives sufficient architectural support to the rather heavy entablature, which carries the low arcade treatment of the second story. The feeling of the Spanish influence has been further successfully suggested by heavy wrought iron baluster grilles which protect the entrances and the several windows. The final touch needed to make the design complete and tie the whole together is found in the well-modeled armorial cartouche which centers the entire design.

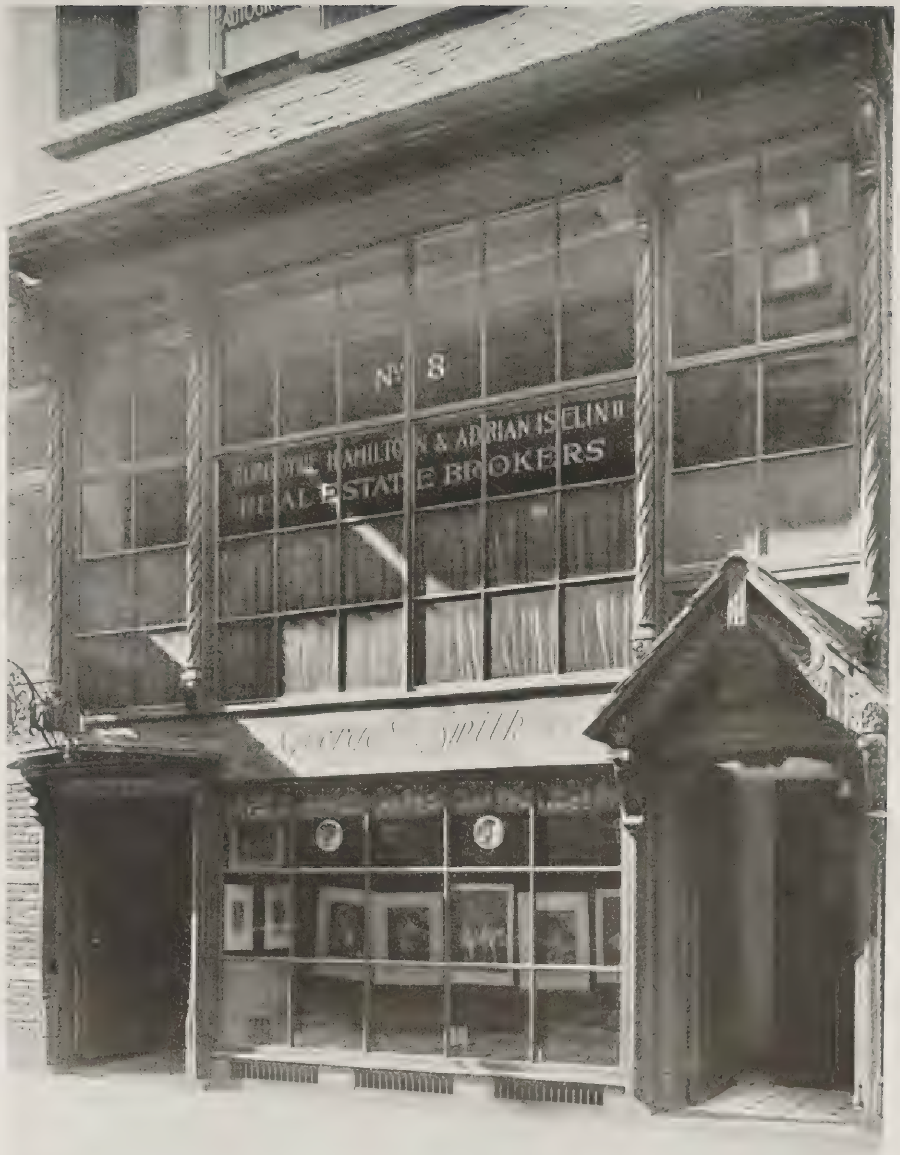
## THE CLUB ROYALE, NEW YORK

Lower Illustration, Plate 92

Although this design is not particularly suggestive of commercialism, no better artistic expression for a shop devoted to the sale of Spanish and Italian antiques could be designed. The exterior perfectly recalls some of the smaller Renaissance houses of Madrid and Seville. The warm toned stucco walls, relieved by the painted iron grilles and window balustrades combined with the unusual quoin blocks, attract without the use of show windows the passer-by to enter. The character of the Spanish Renaissance is still further emphasized by the heavy projecting double cornice painted in browns, blues and reds, and by the broken pediment and large ornamental cartouche over the center window.



A CHEMISTS' SHOP OF SIMPLE DESIGN
BUFF PLASTER WITH BRICK TRIMMINGS



A TWO-STORY SHOP FRONT IN THE ENGLISH STYLE
WALKER & GILLETTE, ARCHITECTS

## GEORGE D. SMITH PRINT SHOP NEW YORK

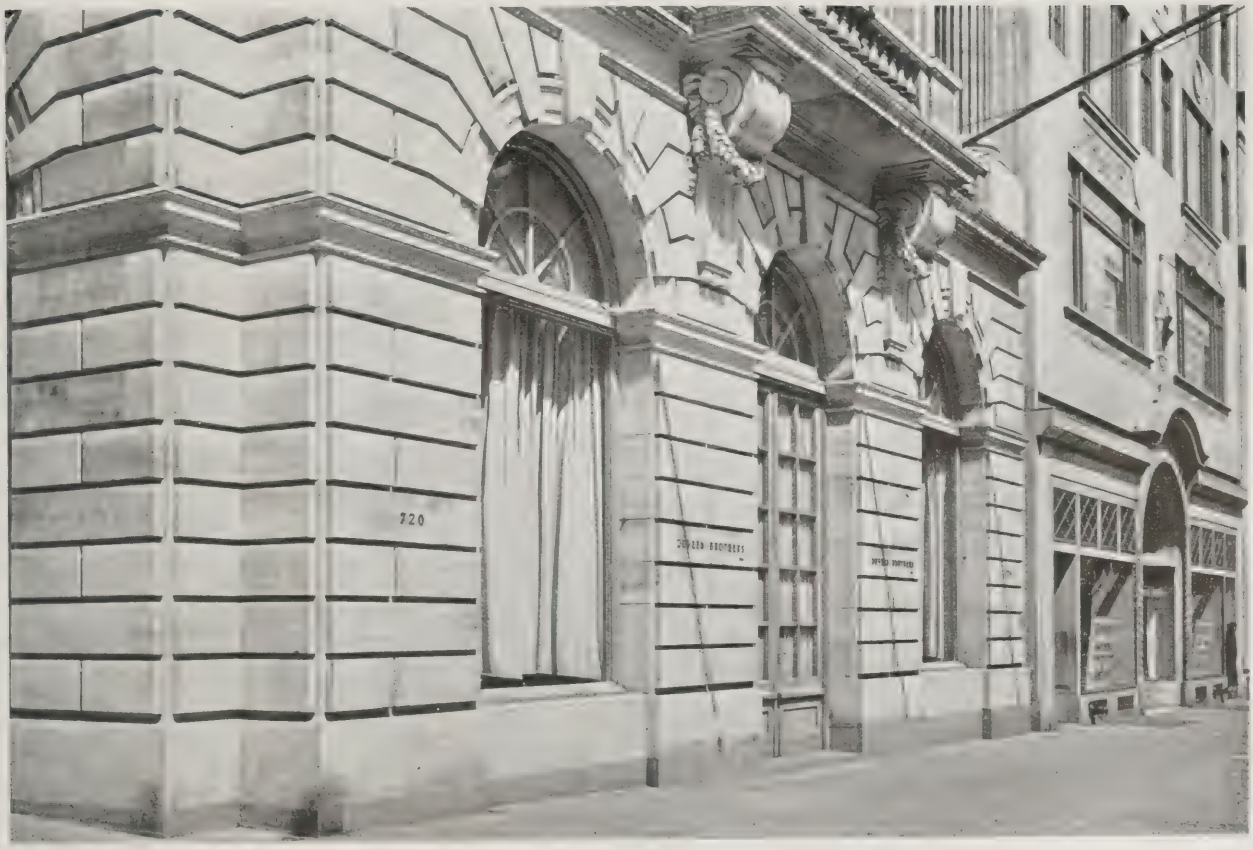
Upper Illustration, Plate 93

In execution and in scale 8 East 45th Street, New York is an unusually good example of the adaptation to modern uses of an old Jacobean store front, yet it is unfortunate that the floor levels of this renovated building should have been such as to give the second story undue importance in the design of the whole shop front. It has been attempted to overcome the predominance of the second story by means of the high gabled entrance porch at the right of the design. Great consideration of scale has been shown throughout the entire design, not only in the uniform size of the window panes employed, but also in the detail of the excellent carved decoration carried out in dark stained wood.

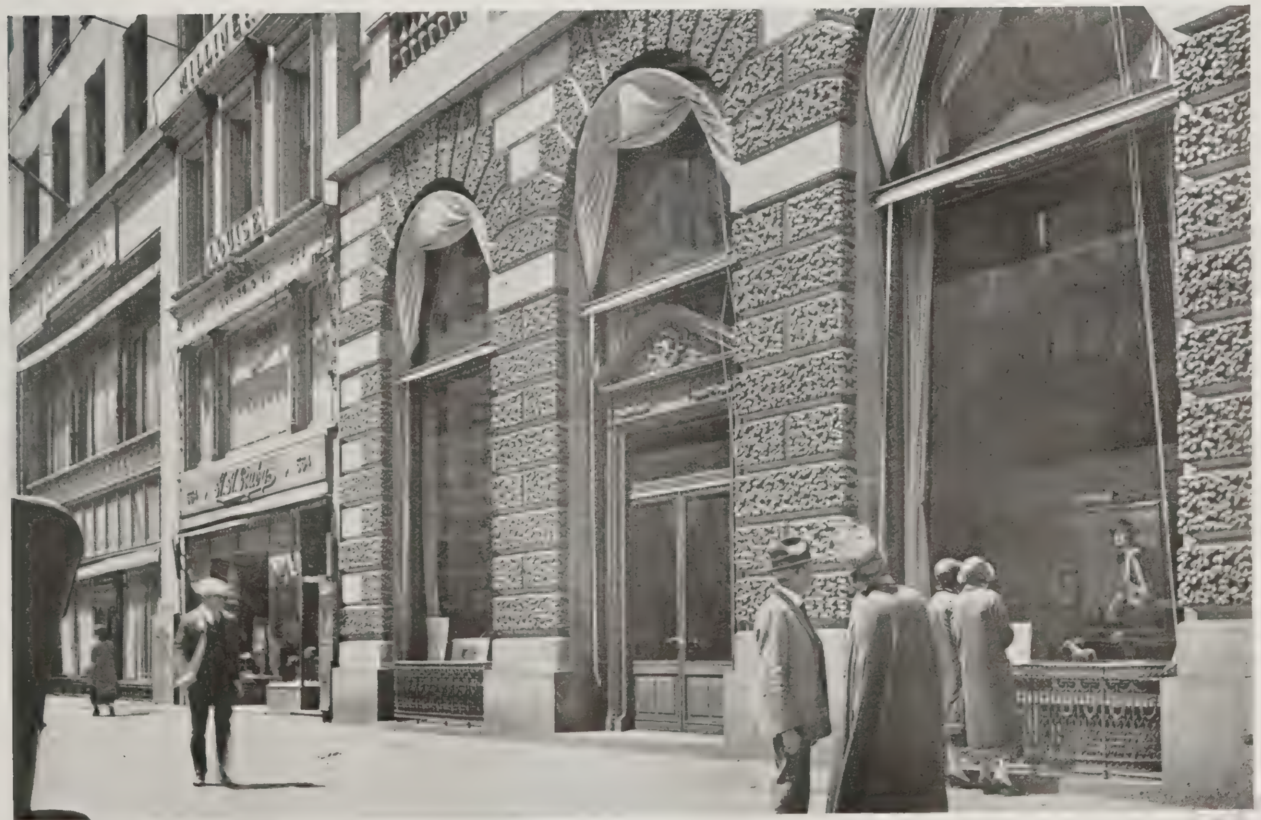
## REID, YEOMANS & CUBIT, INC. NEW YORK

Lower Illustration, Plate 93

In these days when something new and different in every line of life is sought for, it is interesting to see what a pleasing effect has been accomplished in the simple renovation of this corner chemists' shop. The brownstone veneer has been stripped from basement walls of this old residence and use made of rough plaster of a deep yellow tone with red brick trimmings. Besides the introduction of color, to give particular zest as well as scale in all of the show windows as well as the door, small panes of glass have been used. The oriel window on brackets is a pleasing note of contrast to the flat show windows on the side street. There is something quite intimate and personal about this little shop, well worthy of study and emulation.



THE NEW YORK SHOP OF DUVEEN BROTHERS, INC.
HORACE TRUMBAUER, ARCHITECT



THE STORE OF M. KNOEDLER & CO.
CARRERE & HASTINGS, ARCHITECTS

## DUVEEN BROTHERS, INC.
## NEW YORK

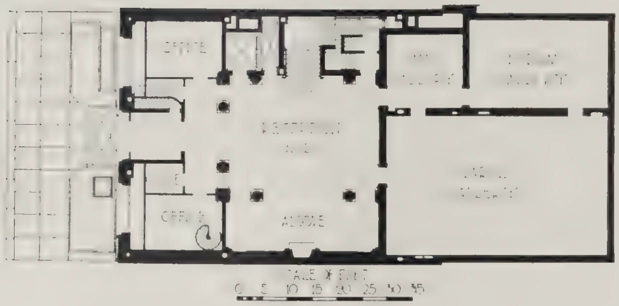
Upper Illustration, Plate 94

In the shop of Duveen Brothers the style of Louis XVI has been so closely followed that one might almost imagine the address to be *Rue de la Paix* instead of Fifth Avenue. Here again the demands of commercialism have been subordinated to fine architectural design. The show windows and the entrance door are formed by symmetrical arches in the front facade. The rusticated treatment of the stonework which is carried throughout the basement story is brought down in alternating voussoirs in the arches, typical of the Italian and French Renaissance. Banks of delicate mouldings which form the caps to the arched piers are carried across the three openings in heavy transoms, above which the arches are divided by curving and diagonal mullions, giving scale to the openings.

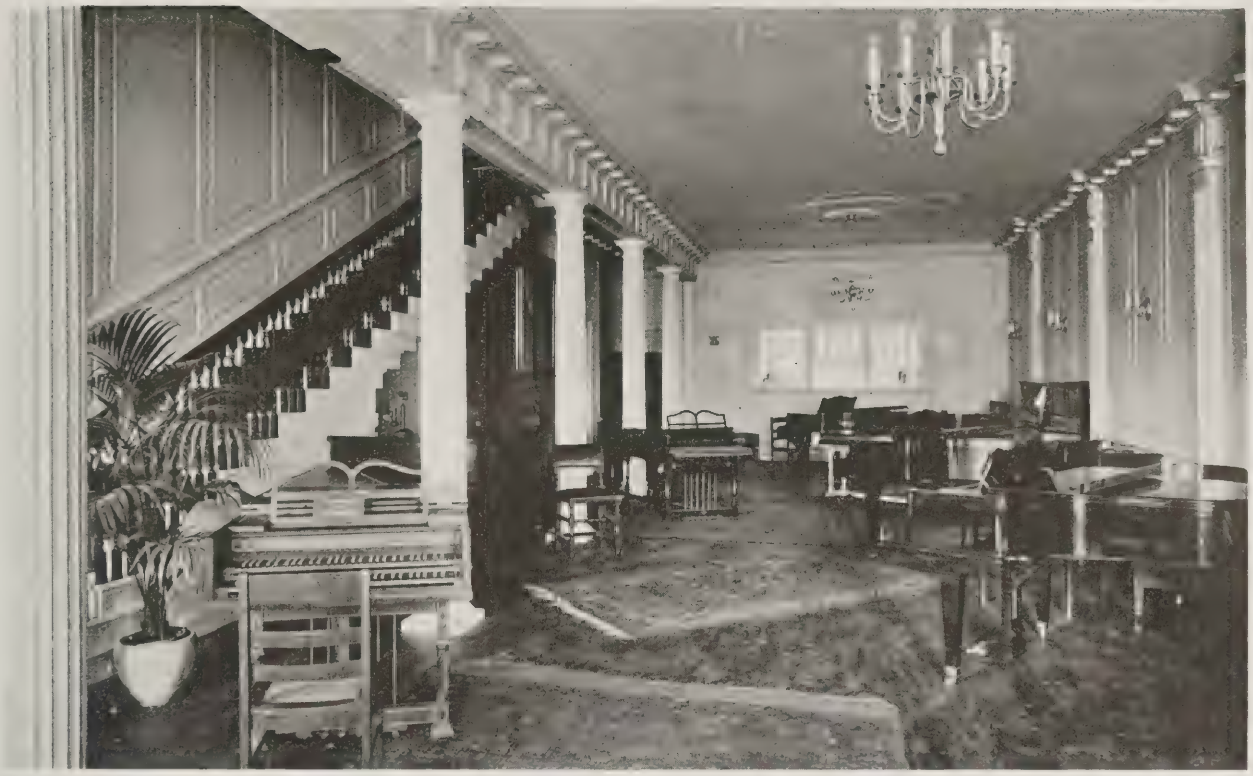
## SHOP OF M. KNOEDLER & CO.
## NEW YORK

Lower Illustration, Plate 94

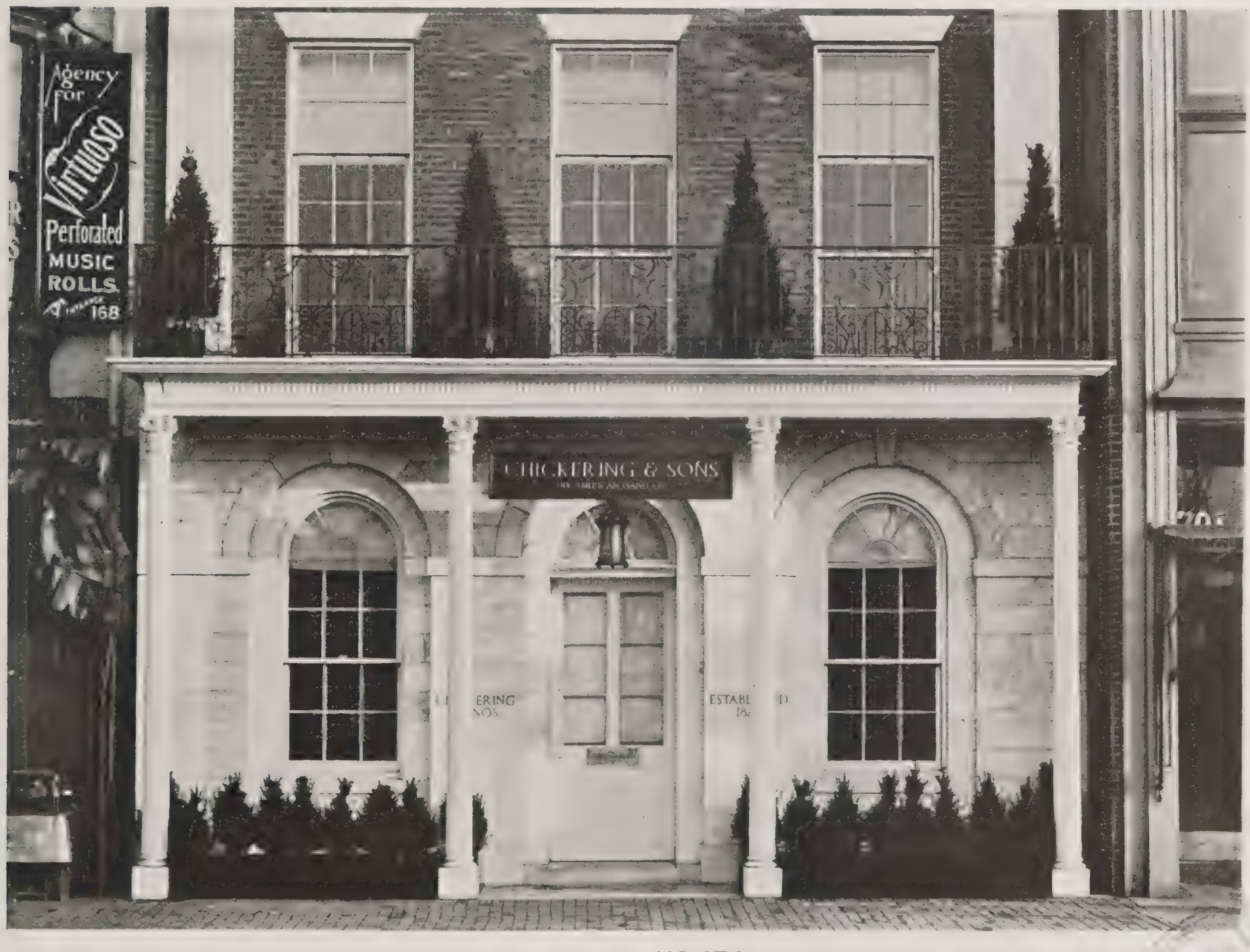
There is little architectural similarity in the designs of these two New York art stores. The shop of M. Knoedler & Co., is an interesting example of the adaptation of palace architecture of the Italian Renaissance to modern commercial requirements. The three large arches, which in Florence would very likely have been enclosed with curtain walls of stone, here give ample open area for overhead light and lower show windows. The center arch is largely filled with a doorway well designed in bronze. The rustication of the piers and arches is of the "vermiculated" type which is frequently found in the architectural designs of Michaelangelo and gives an unusual play of light and shade to what might otherwise be quite ordinary stonework. Guard rails of delicately wrought bronzework protect the base of the large show windows.



FIRST FLOOR PLAN



INTERIOR OF THE CHICKERING & SONS STORE



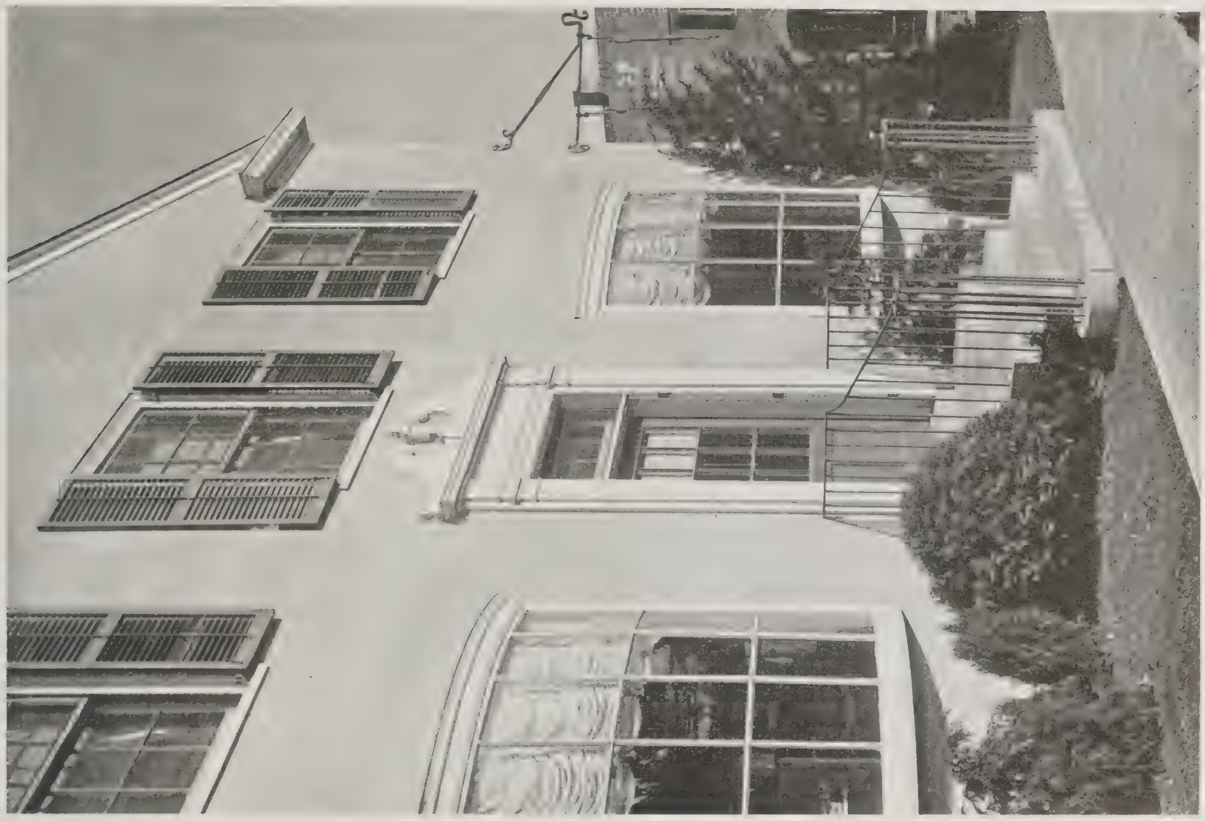
A BOSTON PIANO STORE
RICHARDSON, BAROTT & RICHARDSON, ARCHITECTS

## SHOP OF CHICKERING & SONS BOSTON

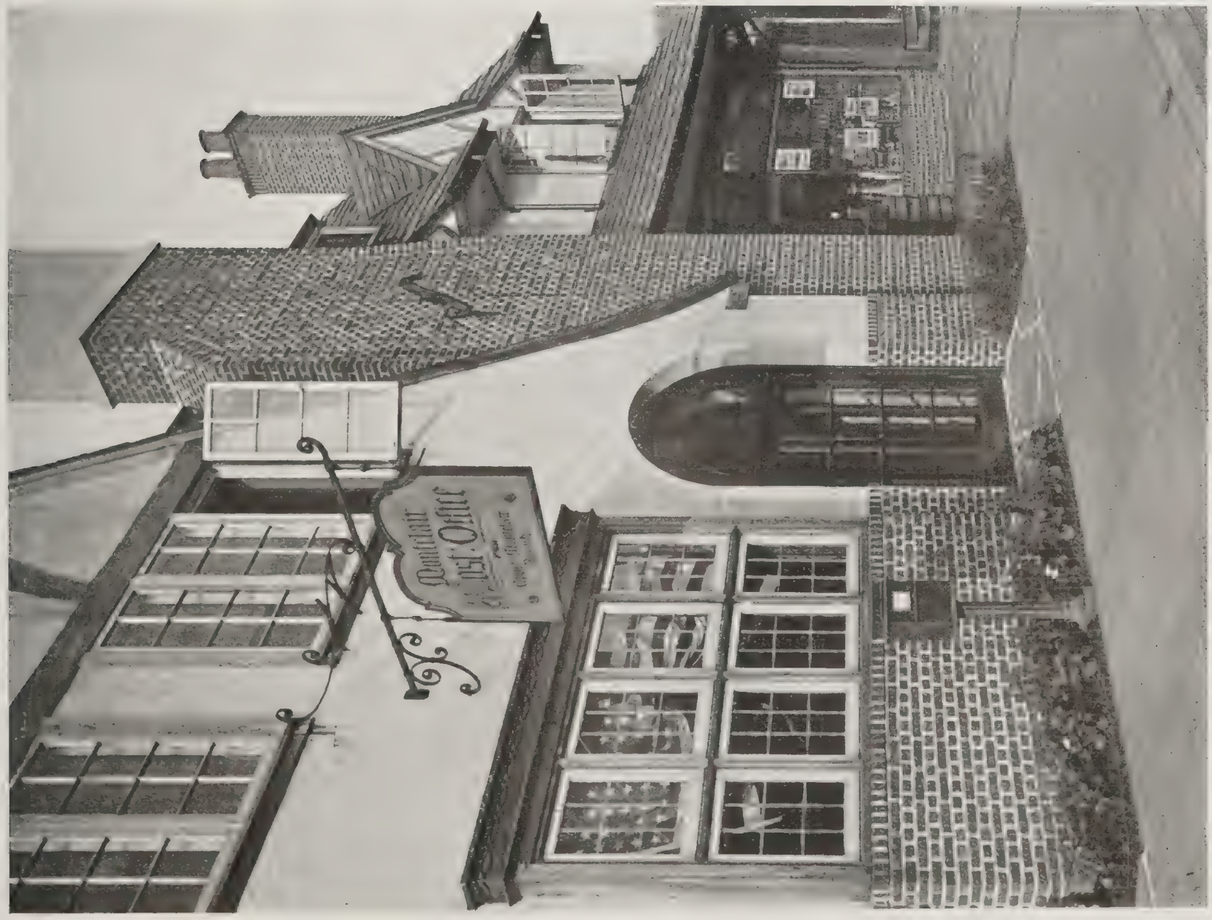
Illustrations, Plate 95

Among the best small shops built in Boston during the past ten years is the showroom for Chickering & Sons. The exterior design, which unfortunately has recently been altered in order to provide a large show window, was originally as shown here, a simple Colonial design in three arches enriched with a delicate portico of slender columns and light entablature. The whole design suggested some of the old house fronts on Beacon Hill.

The Colonial spirit was carried out with equal success in the interior where one large showroom was provided, having pilasters and panels for the treatment of the walls and a Colonial stairway in an open well at one side, while finely modeled columns and entablature defined the ceiling of the showroom.



A VILLAGE STORE IN CONNECTICUT
MURPHY & DANA, ARCHITECTS



SUBURBAN POST OFFICE AND SHOP
FRANCIS A. NELSON, ARCHITECT

## A VILLAGE STORE IN CONNECTICUT

Upper Illustration, Plate 96

In this country shop Murphy & Dana, Architects, have combined domestic with commercial architecture in a pleasing manner. Slightly more emphasis on the commercial character of the design might be desirable, for the design is so restrained and domestic as to suggest hardly any commercial purpose. It might be called the country store de luxe, so finished and refined is the design; but the slightly bowed windows which are supposed to suggest the shop within and the delicate Colonial details of the entrance door with its granite steps and iron railings are all in perfect scale and form a pleasing contrast to the plain stuccoed walls of the building.

## POST OFFICE, MONTCLAIR, N. J.

Lower Illustration, Plate 96

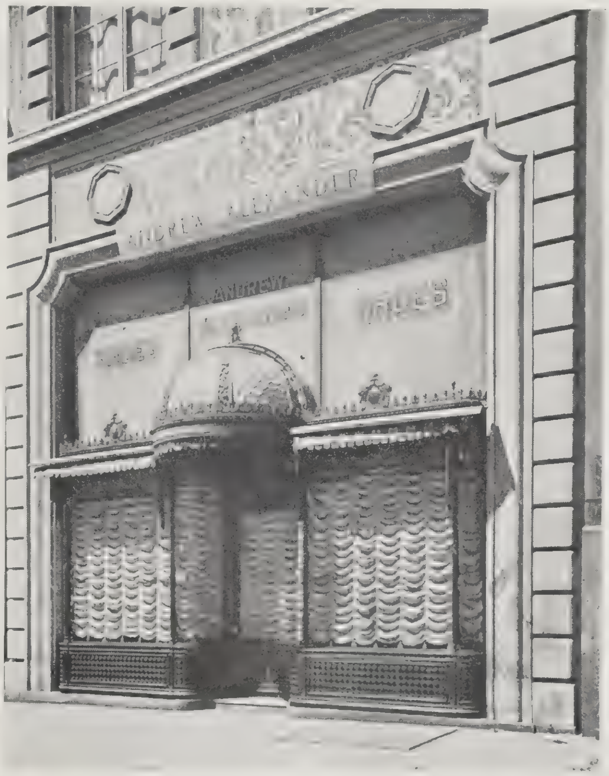
In Montclair, New Jersey, Francis A. Nelson, Architect, has been unusually successful in obtaining a rural quality in the Post Office and shop group recently erected. The group is well studied from points of view of both scale and picturesqueness, to say nothing of color. The small-paned mullioned windows, the numerous dormers and gables and several chimneys with chimney pots sound the note of domesticity and informality so essential to small town architecture. The care with which the various elements of the design have been grouped, as indicated in this one illustration, has given the picturesque quality which seems to be accidental and not intentional. The striking contrast of the red brick and the warm toned rough stuccoed walls gives a refreshing color note to this charming group of small buildings.

# Ornamental Shop Fronts

*By* PARKER MORSE HOOPER

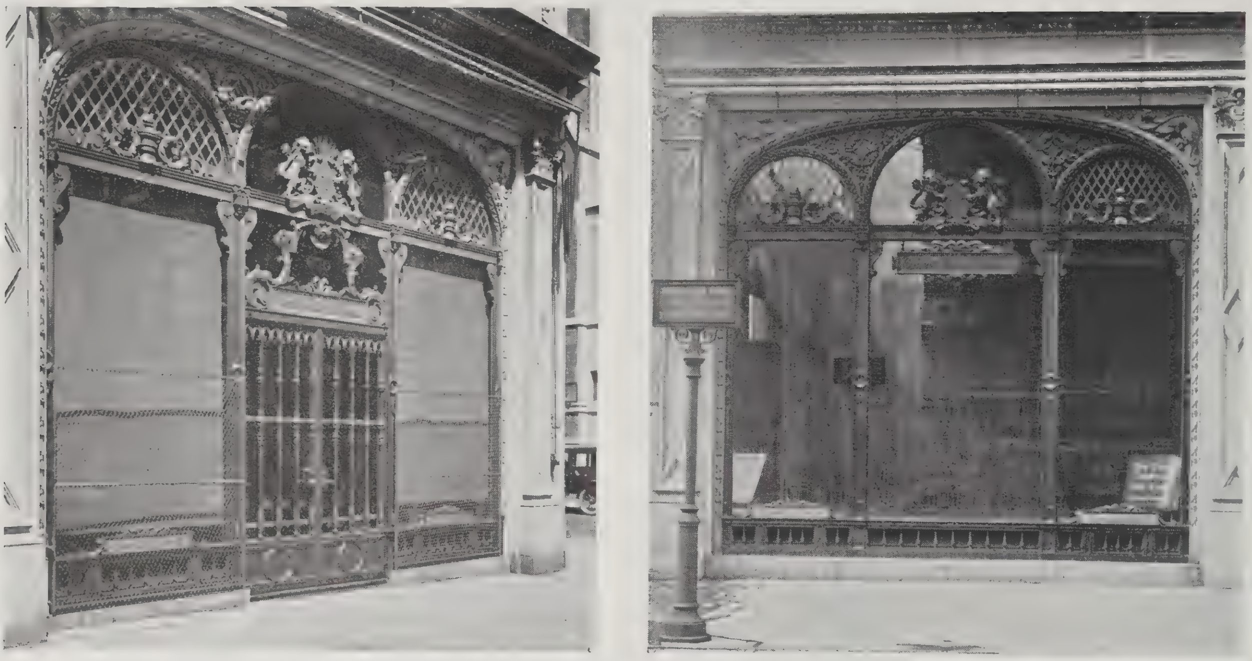
THAT the English shopkeeper is awakening to the commercial value of the architectural shop front is admitted in articles on the subject published recently by the *British Architect* and the Manchester *Guardian*. That the French shopkeeper with innate æsthetic sense and natural shrewdness has always known the business asset of an artistic shop front is evidenced by the care and study spent upon the smallest shop as well as the largest store to make it architecturally attractive and appealing. In fact it is from the French shop front that both English and American architects are seeking and deriving their inspiration in developing this new and distinct type of commercial architecture.

In this country during the last century little thought was given to the design and artistic effect of either the exterior or interior of the store. It was, as it always had been, simply a place for the display and sale of goods, from the general store of the village, where anything from pins to plows could be purchased around the social airtight stove, to the great department store of the city, such as A. T. Stewart built up half a century ago to the amazement and delight of the purchasing public. The department store is only a logical development of the general store of the village; instead of there being one shelf for shoes and stockings, half a floor is devoted to them. As the goods sold have increased in variety and volume, so in proportion have increased the amounts of space devoted to the display of goods, not only within the shop but without as well. The windows, where the passing public sees at a glance the merchandise offered for sale, have been increased in size until they occupy every inch of space not required for entrances. In many stores these vast show windows of plate glass occupy the entire lower story, in some cases even the two lower stories of a street facade. The upper stories of such buildings seem to rest on a basement of glass, where architectural support and adornment, most needed from the point of view of good design, have been subordinated to the commercial idea of utilizing all of that part of the facade nearest the sidewalk for the purpose of display windows,—an idea, which, still prevailing in ninety-nine stores out of a hundred, gives small opportunity for any logical architectural treatment. It is the hundredth store, large or small, which is worthy of appreciative analysis, but happily there are many good examples.



Excellent in Proportions, Scale and Design
Carrere & Hastings, Architects

The gradual migration of the retail shopping district from Union Square, Broadway and 23rd Street, which started 20 years ago, gave the opportunity as well as the inspiration for the creation of a new and distinctive type of commercial architecture such as this country had never known before. Such designs as McKim, Mead & White carried out for Tiffany's and The Gorham Co., and Trowbridge & Livingston executed for Altman's, set the precedent, which every other well known retail store large or small, in one way or another, tried to follow,—designs where structural consistency and architectural consideration were made of paramount importance to commercial demands and traditions, where arcades and colonnades of stone or marble gave ample space for show windows and entrances in facades of great dignity and beauty. Slowly but steadily as this migration goes on, one new shop after another springs up on Fifth Avenue above 34th Street or the adjacent side streets to show a new and varied treatment of the shop front or the store. Lord & Taylor's, at 38th Street and Fifth Avenue, ten years ago was hailed as a worthy example of the finest type of commercial architecture. Then followed, one after another, a succession of beautiful shop fronts, no two alike, yet all possessing the same rare qualities of studied scale and perfected proportion. The inspiration for their design was derived from every known architectural tradition, yet they show such originality of treatment that they cannot be called plagiaristic adapta-



Shop Front of Revillon Freres

One of Several Side Windows

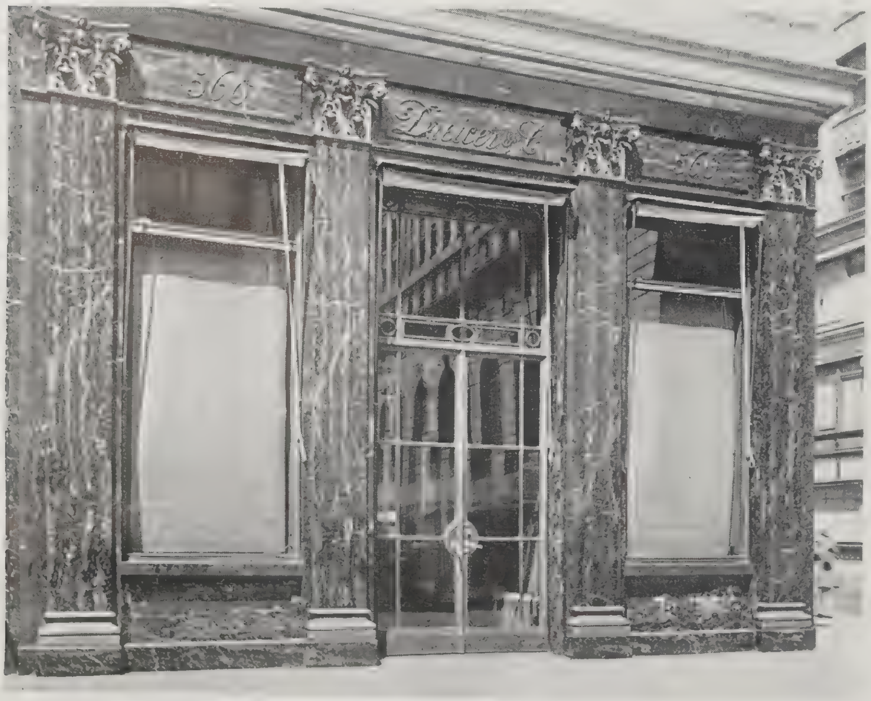
Henry Otis Chapman, Architect

tions. Such a consistency and similarity of scale as are shown in all these recent shop fronts help to give Fifth Avenue an architectural uniformity, which even the variety of individual motifs cannot altogether prevent.

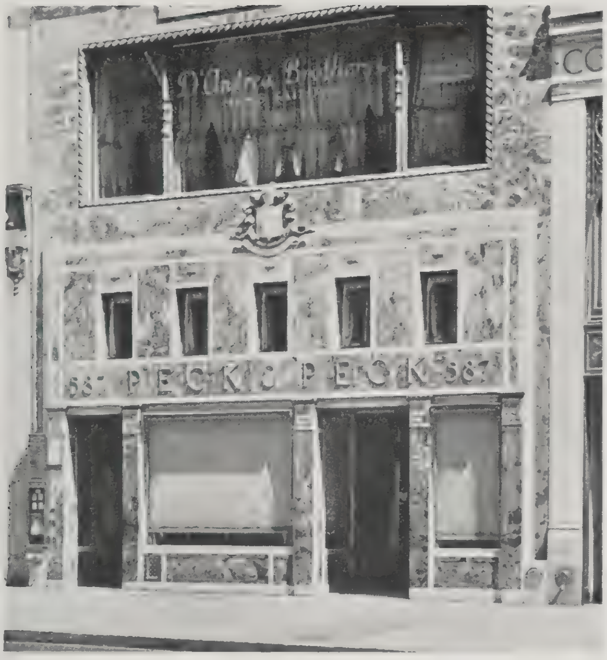
In the individuality of motifs two distinct types predominate. One type utilizes the older idea of making the entire front of glass, regardless of all principles of architectural design, while the other type limits the size of the show window to the requirements of the architectural setting in which it is an indispensable element. Through this latter treatment it is possible to give a uniformity and consistency to the design of the entire building, which obviates the undesirable and non-structural effect of a masonry building resting upon a basement of glass, which is invariably unsatisfactory.

The material with which these two types of shop fronts are carried out has much to do with the individual charm and character which are so perceptible. Bronze, marble and architectural terra cotta have been combined in many delightful designs, but they have been employed so frequently almost alone, that it seems desirable to consider each material separately.

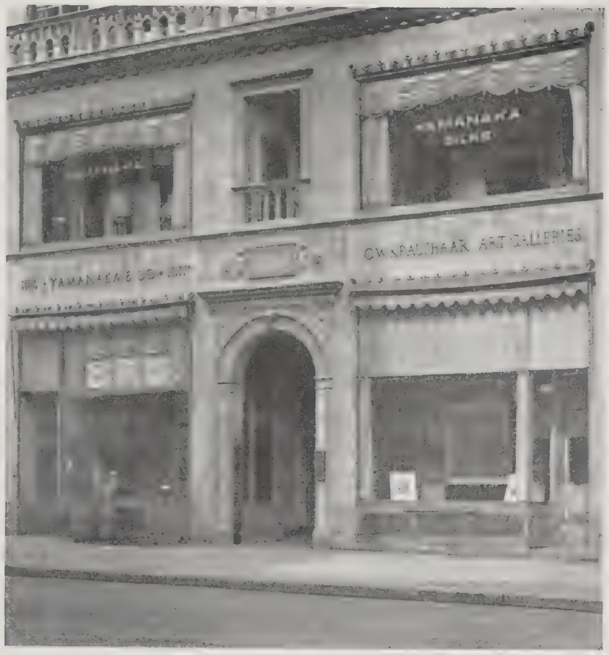
It is in the attempt to give the large open shop front with its expanse of plate glass some sort of architectural scale and treatment that bronze has come into popular use. The structural frames which divide the front into entrances and windows, when constructed of bronze or wrought iron, are adapted to use of rich ornamentation. Often the upright members are designed as slender pilasters elaborately decorated in low relief in the styles of the French or Italian Renaissance, or as carefully turned balusters after



Effective Use of Black and Gold Marble and Gilded Bronze
Warren & Wetmore, Architects

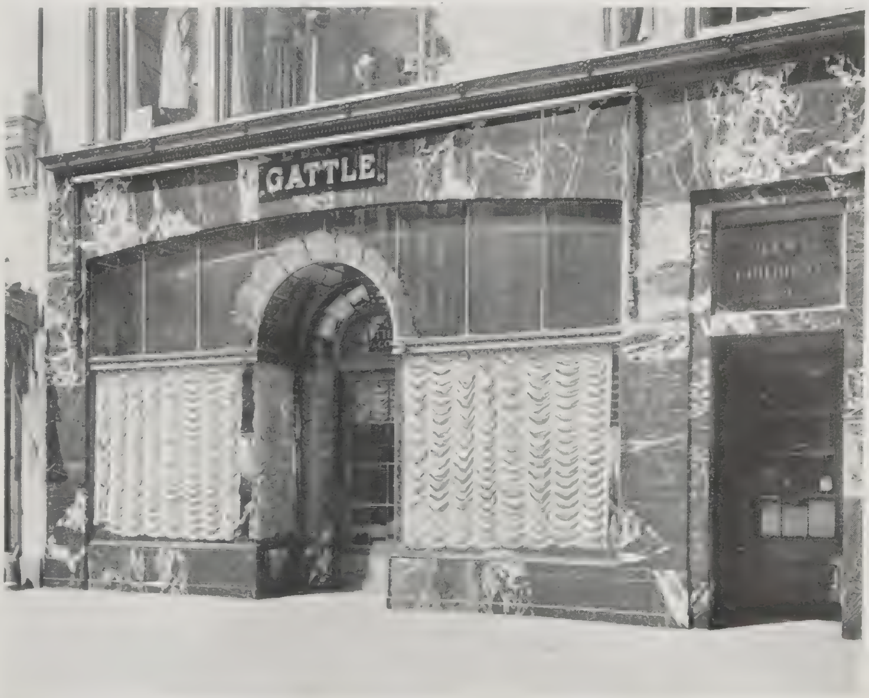


Interesting Use of Colored Marbles
G. A. & H. Boehm, Architects



Shop Front at 680 Fifth Avenue
Welles Bosworth, Architect

the Spanish style. The horizontal members are arranged sometimes as narrow cornices crested with delicate decorations of scrolls and small anthemions, suggestions of Greek and Roman ornament, or they are built up of slender mouldings charmingly chased and carved. Among the recent examples of elaborate bronze work are the fronts of Alexander's and Revillon's on Fifth Avenue, to mention only two. In the Alexander shop, Carrere & Hastings have combined in a masterly manner perfection of proportion and scale with refinement of detail and design. The restraint of the rustication of the basement and upper window trim, together with the soft coloring of the marble moulding enframing the shop opening and the delicate tints of the sgraffito decorations on the plaster wall surfaces above, suggest Italian influence in the design of this beautiful building. It is in striking contrast to the vigorous treatment of this shop facade as a whole that the most delicate designs in bronze have been used to ornament the tops of the show windows and the interesting domical glazed hood which protects the entrance door. In the Kirkpatrick shop a still more elaborate use of bronze detail is found in the balusters' supports and ornamental frieze band of the windows, as well as in the entrance doors themselves, showing panels and over-decorations in low relief. The delicate decorations of the corner balusters and the cornice and finials above the door are worthy examples of the metal worker's art. In the two facades of the Revillon shop is found, perhaps, the most elaborate as well as the most successful use of bronze detail. Here the entire architectural treatment of each window has been carried out in bronze in a most interesting design slightly



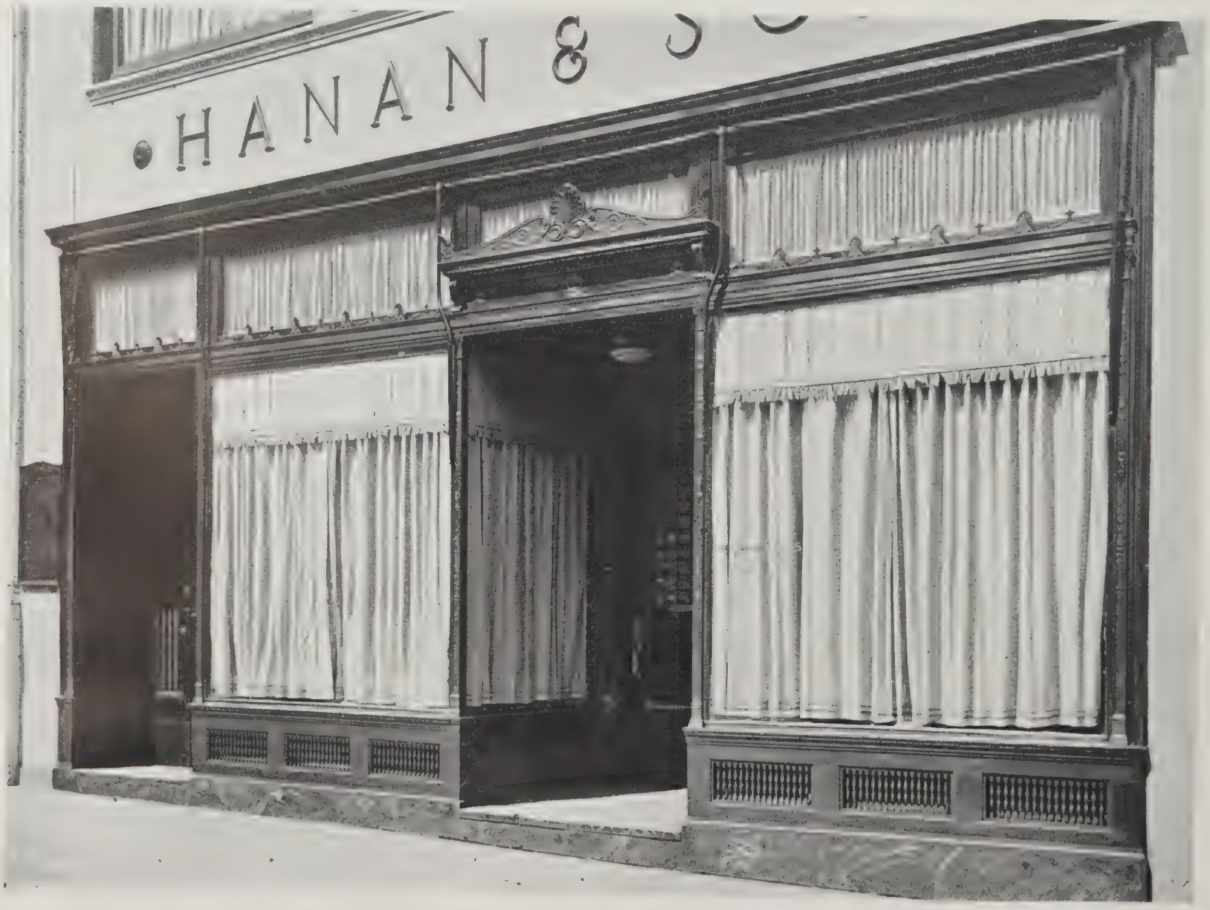
Bronze Muntins and Black and White Marble
Starrett & Van Vleck, Architects

suggestive of the French style of Francis I. The large segmental arched windows have been given a splendid sense of scale by breaking them up with arches, pilasters and cornices of bronze.

Marble has many qualities to recommend it as a material for the decoration of shop fronts. First of all, because of the variety of tones and colors in which it may be procured and the innumerable contrasts and combinations in which it may be used it is desirable, and for a second reason, because the highly polished surface of marble gives protection and permanency to the color, where lasting color effects are desired. As the use of color in every form of architectural decoration is becoming steadily more popular, so marbles of every known hue, stone in browns, yellows, grays, pinks and whites, and the limitless range of colored terra cottas are being employed to an extent unknown before.

Perhaps the most successful use of marble is in designs such as the Dreicer shop front, where pilasters, base and entablature of black and gold marble have been combined with dull gilded bronze in pilaster bases and caps and in the trim of the windows and doors. The effect, which is both rich and restrained, makes a very pleasant contrast to the typical facades of limestone and light brick. Another example where marble has been used successfully, if less architecturally, is found in Gattle's shop front. Here large polished slabs of black marble veined with white have been used to enframe the entire shop opening. With the marble has been combined plate glass held in place by thin bronze members and muntins in an unusually simple and straightforward design. Even the scalloped glass cresting which forms a sort of hood over the doortop is without metal decoration of any kind. At 587 Fifth Avenue a very striking marble store front was designed for Peck & Peck. This front is interesting on account of the combination of two kinds of marble used for the trim and the surface of the three lower stories. Although the effect is rather startling, the design as a whole would be quite successful had it been possible to tie together the upper and lower portions of the facade, which as shown have no architectural connection or conformity in scale or design. Even the pilaster divisions between the openings on the street level have no relation with the wall spaces between the five small windows on the second floor.

The shop front at 680 Fifth Avenue illustrates the use of the second story show windows which are now in wide use for the exhibition of objects which are fairly large in size. The design has been so handled and the openings so well grouped that notwithstanding the large proportion of door and window space the facade presents an appearance of strength, dignity and consistence.



Admirable Because of Its Good Proportions and Simple Design
A. D. Seymour, Jr., Architect

# The Development of the Arcaded Shop Front

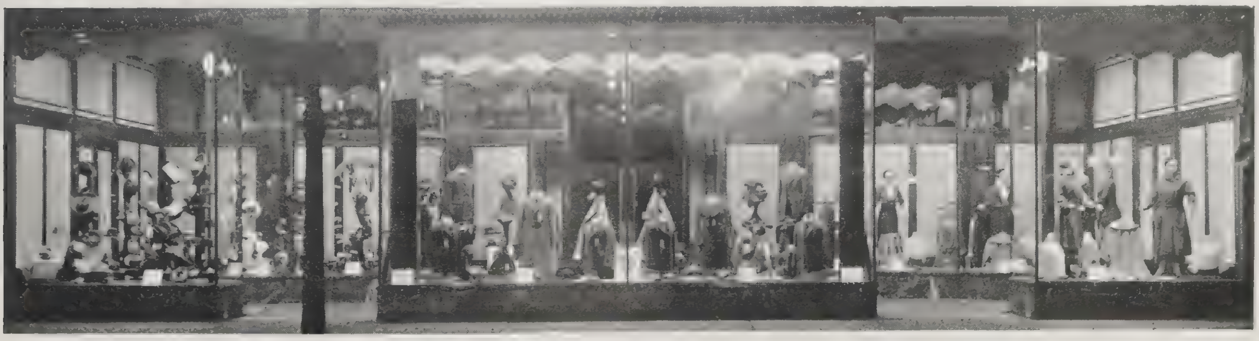
TODAY, as a person walks along the commercial thoroughfares of the nation, he finds store front after store front, almost continuous on both sides of the more important streets, designed so as to attract his attention, and present to him in the most appealing manner the merchandise that is for sale within. To the casual observer these attractive store windows and the artistic displays of goods they contain may mean only a general indication of tempting prosperity, shown by the style and success of the merchants, but to the architect who permits his mind to briefly reflect, they tell a story of real and rapid development of one branch of his profession's work.

Until about 50 years ago show windows in the stores of this country were made of small pieces of window glass. History tells us that plate glass was first used in large sheets for display window purposes by an American merchant in the 70's of the last century, and that it came about merely as an accident. In some way most of the window glass in one of the old wooden sashes of his single show window was broken. The weather being a bit chilly, it was necessary for him to close the opening. Rather than board it up, he scraped the silver from a French mirror, removed the damaged sash and put the large, clear glass in its place. Even in those early days the increase of his sales of articles displayed in the window, makeshift as it was, was noticeable, for it permitted people to see his goods better than they could before the accident happened. What was true of the sales power of this chance pioneer's show windows was even then, although not fully realized, true of all merchants' store fronts, for as said years later by Marshall Field, "goods well displayed are half sold." That fact, combined with the more open effect obtainable with the plate glass front, brought it into common use in a comparatively short time.

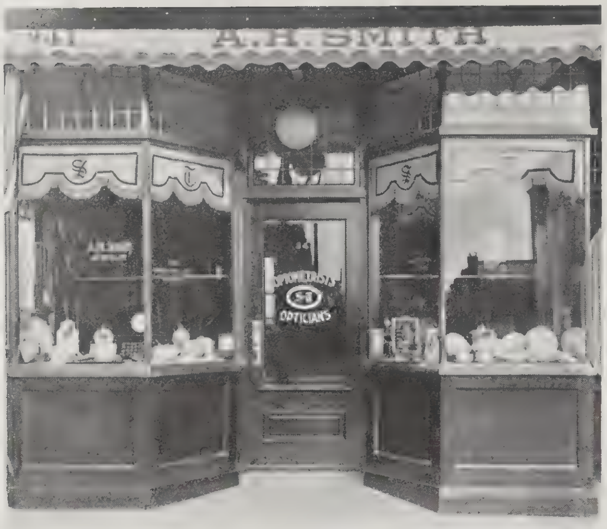
The first of what we now know as modern store fronts was not built until seven years after the Spanish-American war. That first group of show windows built as a sales asset for the merchant was erected about the time that the first two-cylinder automobile was chugging its way on Fifth Avenue. Since then the development of the art of display of merchandise and the advances made in highway transportation have gone forward almost hand in hand. In the late '70's, and even during the early years of this century, the merchant who transacted his business behind dingy, dark and unattractive show windows was not considered particularly out of date, but today if that same storekeeper has continued in business, if he has progressed as is so essential for his own welfare, it is likely that the front of his building today has an appearance that "pulls" trade 24 hours of each day.

The store front of today was not a sudden development, but rather took form step by step. The development and more common use of structural steel made possible the elimination of supporting columns which formerly limited the width of single show windows. The bulky wood setting and corner posts which obstructed the view of passers-by and which were anything but permanent, were replaced by small yet sturdy sash and bars made of some indestructible metal. The mouldings of which these parts were formed were and are today small and inconspicuous, yet they are so shaped that they not only have beautiful curves and sharply defined corners but also hold the glass in a firm, resilient grip, thereby reducing to a minimum the possibility of glass breakage. The development might have stopped at this point, but it went on in order that the entire store front might be right and complete from sidewalk to cornice line and from corner pier to corner pier of the building. Head jamb, side jamb, transom bar and bulkhead coverings were provided, permitting any number of variations, and at the same time permitting the use of stock material with which every possible condition of new or remodeling work might be met.

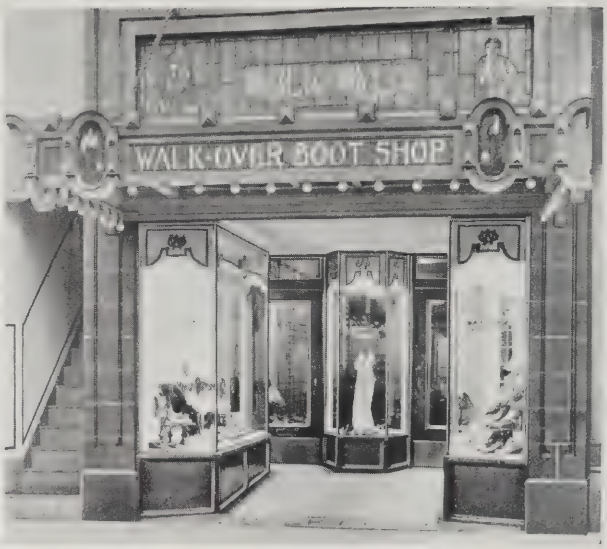
More complete education of the merchants in all lines of business activity throughout the entire country soon brought about a much fuller appreciation of the real sales-producing value of their glass window fronts, which formerly had been largely



An Excellent Example of the Modern Arcaded Shop Entrance. Every Advantage Taken of Unusual Width

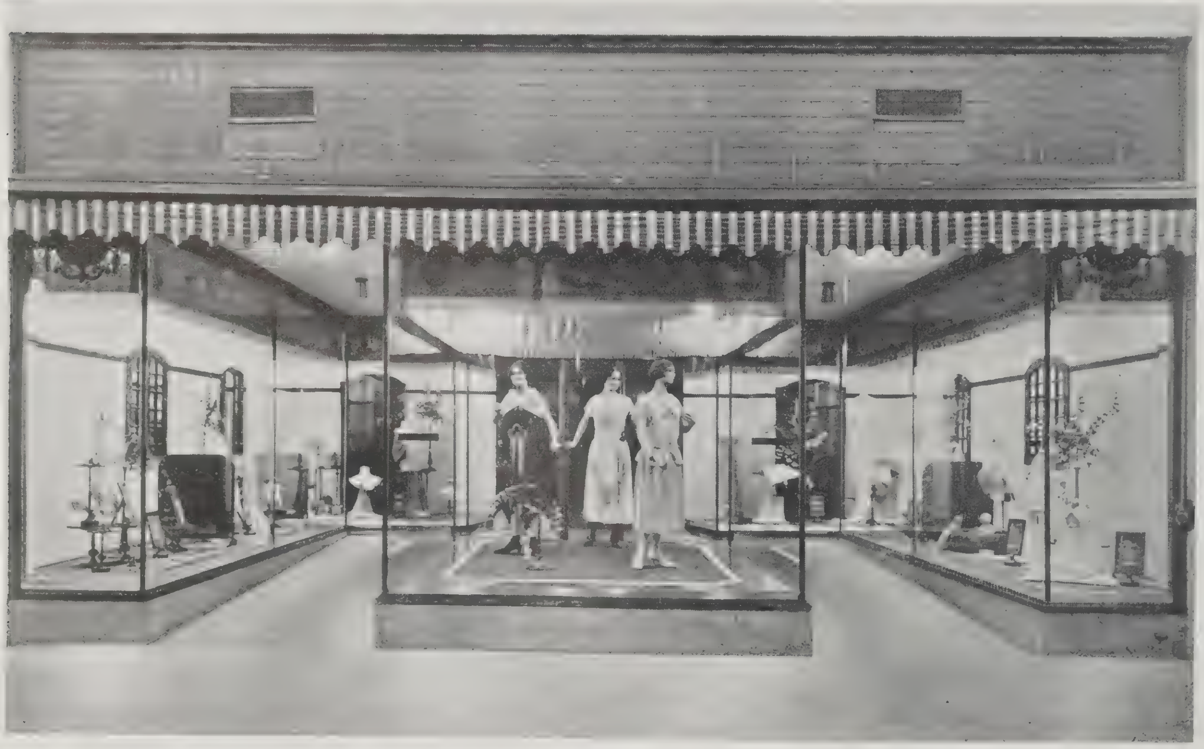


Recessing Door Creates Deep Windows. Excellent Opportunity for Display

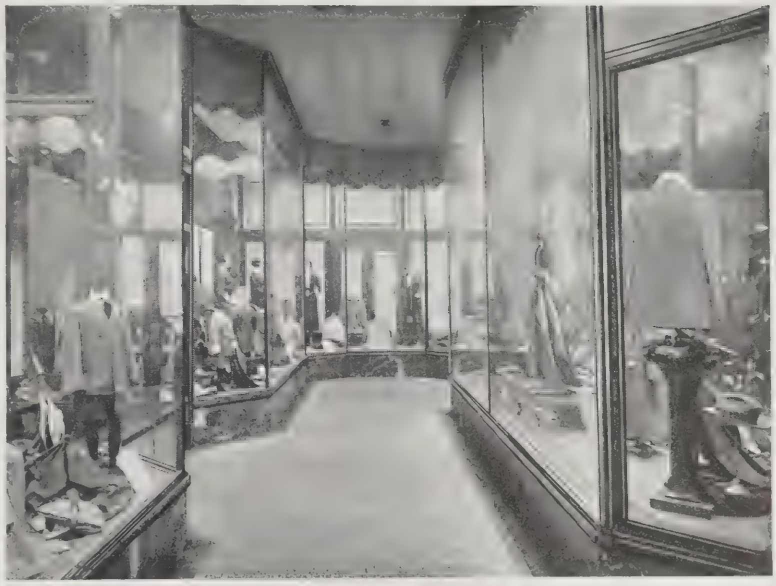


The Utmost on a Narrow Plot; Arcading Affords Window Space

neglected, having served mostly as a protection from storm and theft. The response, which was prompt, helped to pave the way for the neater and more profitable designs which this new material made it possible for architects to submit to their clients. The level of store floors came to be made about the same as that of the sidewalk outside instead of being two or three feet higher, thus making it much easier for prospective customers to enter the merchants' places of business. This may seem to be but a detail, yet it is a detail of importance for the buying public, which like the water of a river, to quite an extent, follows the line of least resistance, so that all obstacles, however slight, which might deter people from entering and buying should be removed. The heights of window floors were made to conform to the kinds of goods displayed, for it was realized that furniture should be shown at nearly the level of the sidewalk, while rings and other articles of jewelry should be presented to the public in about the position a person naturally holds his hand. In this way came about the early application of the law, which was later formulated thus: "Merchandise to be displayed to the best advantage must be shown to the

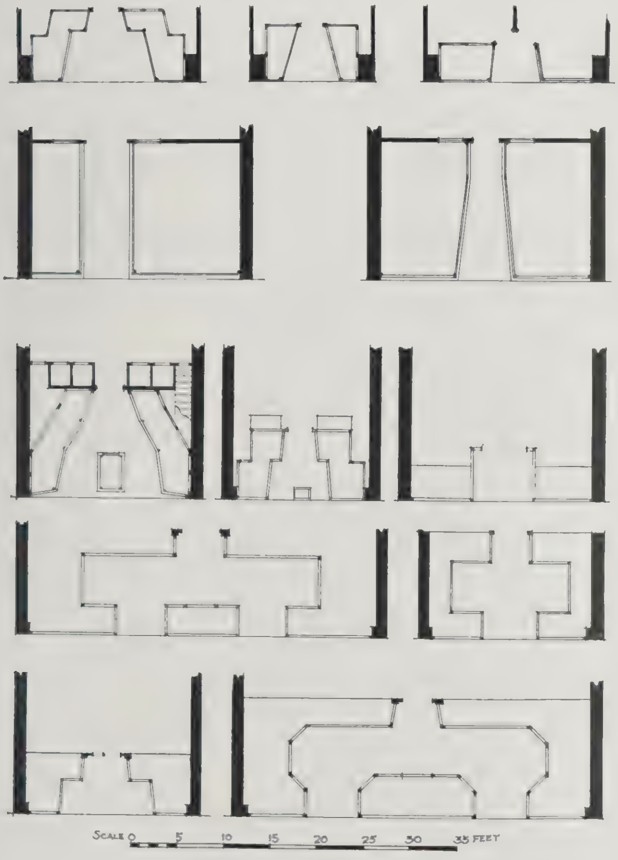


Could More Attractive Window Display Be Easily Imagined? Result of Arcading, Keeping Floors of Windows Low public in as nearly as possible the position in which it is intended to be used."



Arcaded Entrance to Men's Clothing Store. Windows Shallow But of Large Frontage

The early store fronts in which plate glass was used were of the most simple design, a straight front and a door, with perhaps a slight return at one side or the other. Advancing from this to another stereotyped design, the door, with a narrow and shallow return, for a while was commonly placed in the center with show windows at each side. But with the introduction of metal settings these two old fashioned types of fronts, although still occasionally used, were largely thrown into the discard, being replaced by layouts which were much more elaborate, more beautiful, and which also permitted a much greater display footage on lots of the same width. With the growth of our centers of population and corresponding increase in always high property values and rentals this feature has come to be of more and more importance. It is, of course, quite largely the power of property to produce sales that determines the return it will bring on the investment, while at the same time the power of a location to effect sales is to a greater or lesser degree dependent upon the footage of display it affords. It is this fact as well as the desire for the best possible appearance that has brought about the greatly increased popularity of the "arcade" style of front that is now so often used in New York, Chicago and other cities. By having store fronts of this type of design, with one or more "island" show cases, the display footage on a 50-foot lot may be easily made as much as that on a lot of 150 feet or even more. Although the financial returns are probably not in direct proportion to this increase of display footage, they are related to it to such an extent that the extra cost of the more extensive "arcade" store front has proved to be a good investment for thousands of merchants.



Plans of Several Arcaded Fronts

In the design, manufacture and sale of standard store fronts, the goal has been to give the architect the best possible material, and neither effort nor expense has been spared to accomplish this end. Manufacturers have striven not only for better appearance, but also for absolute permanency, making the store fronts waterproof, reducing glass breakage to a minimum, and very largely eliminating those two old time shopkeeper's bugbears, dust and frost. These ideals have been attained through years of study and experience. As buildings of today are built to stand for centuries, so the glass setting should be equally enduring. Realizing this, the manufacturers of modern store fronts make use only of metals that do not rust or deteriorate. All kinds of putty or cement, which in time is almost certain to harden and crumble when used for the setting of large plate glass, have been eliminated. By using solid copper or bronze for all glass-setting members, the demons "rust" and "upkeep" are eliminated so far as the store front is concerned.

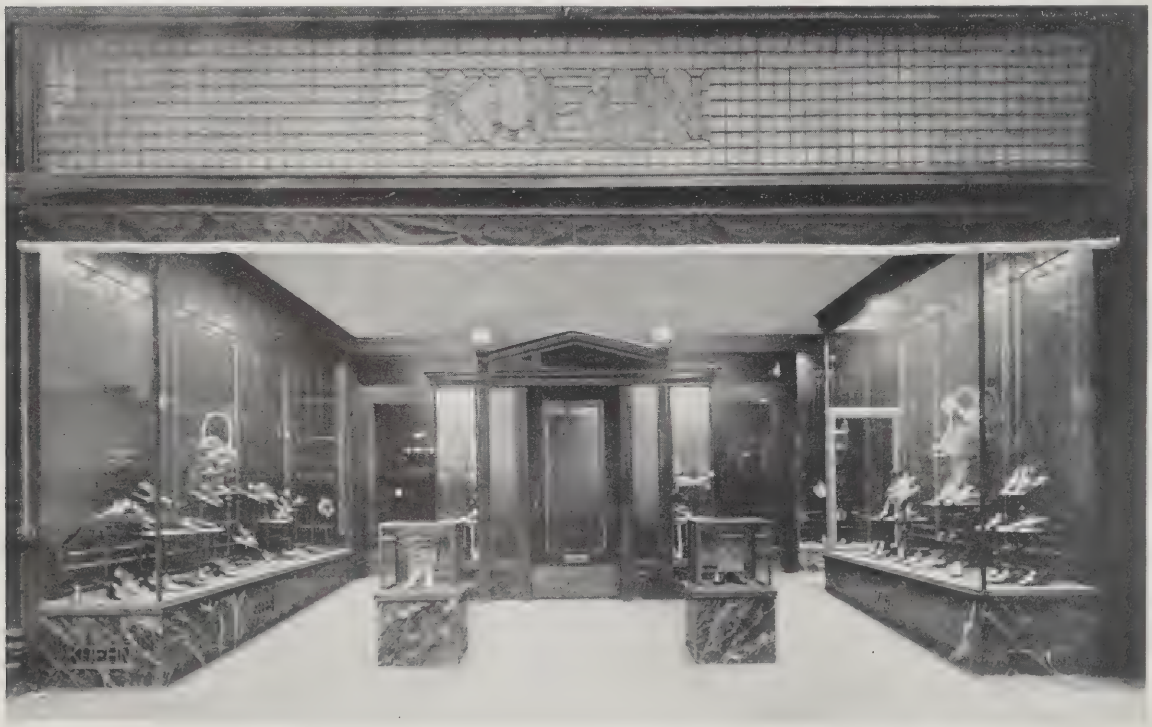
Twenty years ago all merchants doing business in the northern states were confronted with the ever-present problems of frost during the winter and dust during the summer. The store front of today would not do for the merchant what it ought to do unless it did its share to reduce the possibility of such troubles. For this purpose ventilation holes are punched in both the inner and outer members of the sash. During the winter these holes permit a circulation of cold dry air near to the inside surface of the glass so that the possibility of forming of frost or sweat is reduced to a minimum. In the summer these openings may be closed by means of a small slide which is a part of the sash setting. When these holes are closed in this way the front is as nearly as possible proof against dust.

Following closely after the introduction of metal setting for the plate glass of store fronts, there came many improvements and refinements in show window lighting arrangements, background construction, signs, awnings and other accessories that are essential to the attractive appearance of a store front. In the old days if show windows were lighted with electricity, in most cases the lamps were suspended from the ceilings in such positions that they threw a repelling glare into the eyes of anyone passing. This is all changed now, for it has been shown that the most efficient results are obtained when the lamps are hidden from view, the light being thrown onto the goods exhibited rather than into the vestibule or into the eyes of people who stop to view the merchandise displayed. Merchants have learned full well that light attracts and that properly illuminated show windows make many future sales during the evenings when the stores are of course closed.

When a marquise is not used, an awning in many cases must be put up to shade the store front. The various types of frames and adjuncts now on the market entirely eliminate the necessity for the ugly vertical and horizontal braces that formerly were required to hold awnings in place. The awning crank box is now being used less and less, because its appearance is objectionable and there are other more satisfactory methods of rolling up an awning.

Many concerns have specialized in the manufacture of ornamental signs. Others have devoted their attention to the building of window backgrounds that are beautiful, yet not so elaborate as to detract from the merchandise displayed in the windows. Rich marble and bronze grilles have come into quite common use for bulkhead construction. Tiles of many different kinds and patterns are available for entrance and vestibule floors. Ceilings over entrances, instead of being flat and straight across, as was almost the universal custom until recently, are now often arched or vaulted to conform to the style of architecture employed throughout the building.

The result of all this activity and development in the designing of store fronts has given us in this modern day and age the most practical type of commercial store front in the world, with the best of the world's materials at our command. These facts, combined with the desire for "up-to-dateness" on the part of the modern business man, which in turn is founded upon the homely but basic truth "it pays," have made and will continue to make possible store fronts which are sources of pride to the architect, his client and to the entire community.



Large Extent of Show Window Space on Plot of Average Width. Area Left for Occasional Use of "Island" Displays

# Showcase and Counter Arrangement

*By* HARRY F. SIPPLE

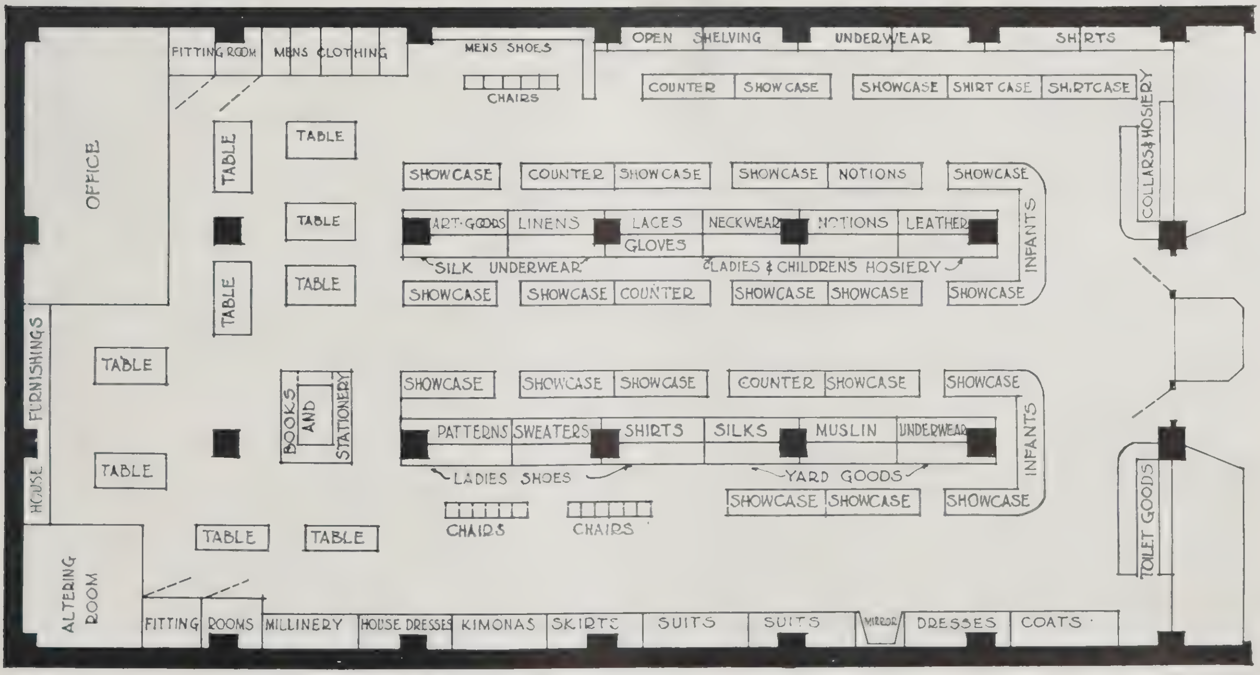
THE designing and planning of store fixtures are coming more and more within the sphere of the architect. In previous years the small merchant depended entirely upon himself and the store fixture salesman to plan and design his store, and as a result, if a competitor opened a shop in the immediate vicinity the design and general lines of his fixtures were in detail the same. Today not only the large department stores but the small merchants as well are retaining architects to lay out and design their display fixtures, which gives each store an individuality of its own. Last year in New York alone more than $30,000,000 was spent by merchants in every kind of business for store fixtures. It is estimated that about $90,000,000 worth of fixtures was used in the whole United States, but of this amount it is safe to say that only half was designed by architects.

In laying out and designing store space it is always good policy for the designer to study the needs of the merchant. By this is meant consideration of the kind of people catered to, the amount of merchandise carried in stock, and the general character of the location. For instance, in fitting out a small department store, something like that the plan of which is shown herewith, the merchant did quite a large business in men's furnishings and devoted one whole side of his shop space to this line of goods, while another merchant in the same neighborhood, who had a store about the same size, devoted only one-quarter of the space to men's furnishings.

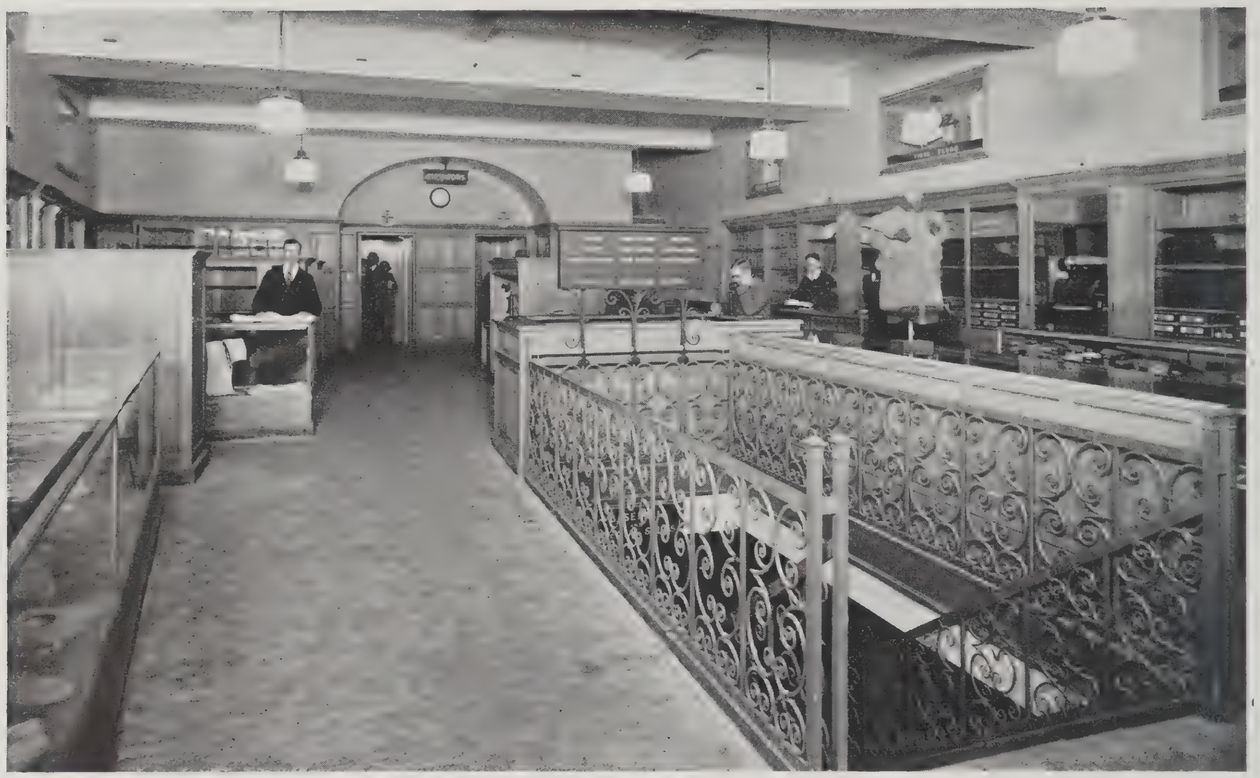
The accompanying plan is considered ideal for a small general store, as the various departments are compact and all the goods are on display. As the visitor enters the store, his attention is attracted to the two large round corner showcases, each equipped with one plate glass shelf and electric reflectors. These cases, as well as all the other showcases in the store, are 40 inches high and 24 inches wide. The three aisles are sufficiently broad to give an unhampered approach to the rear of the store. On the right-hand side, directly back of the show window, is a length of shelving for men's hosiery and collars with a round corner showcase for the display of neckwear in front. Running along the wall are shirt and underwear cabinets. The purpose of these is that all the merchandise may be on display and assorted in various sizes. Adjoining the underwear cabinets is a length of open shelving for nightshirts, belts, etc. The men's shoe department comes next. The shelving used is spaced for two boxes in height. The men's clothing department is equipped with five clothing cabinets. These cabinets have pull-out hangers and are enclosed with glass doors, and adjoining the cabinets are two fitting rooms.

In the center aisle specially constructed cabinets are made for the display and stock of art goods, linens, laces and ribbons, women's neckwear, notions and leather goods. These cabinets have lifting, receding doors. The opposite side has open shelving for women's and children's hosiery, a glass front drawer cabinet for gloves, and a receding door section for silk underwear. Specially made floor showcases are used around this section for notions, ribbons, etc.

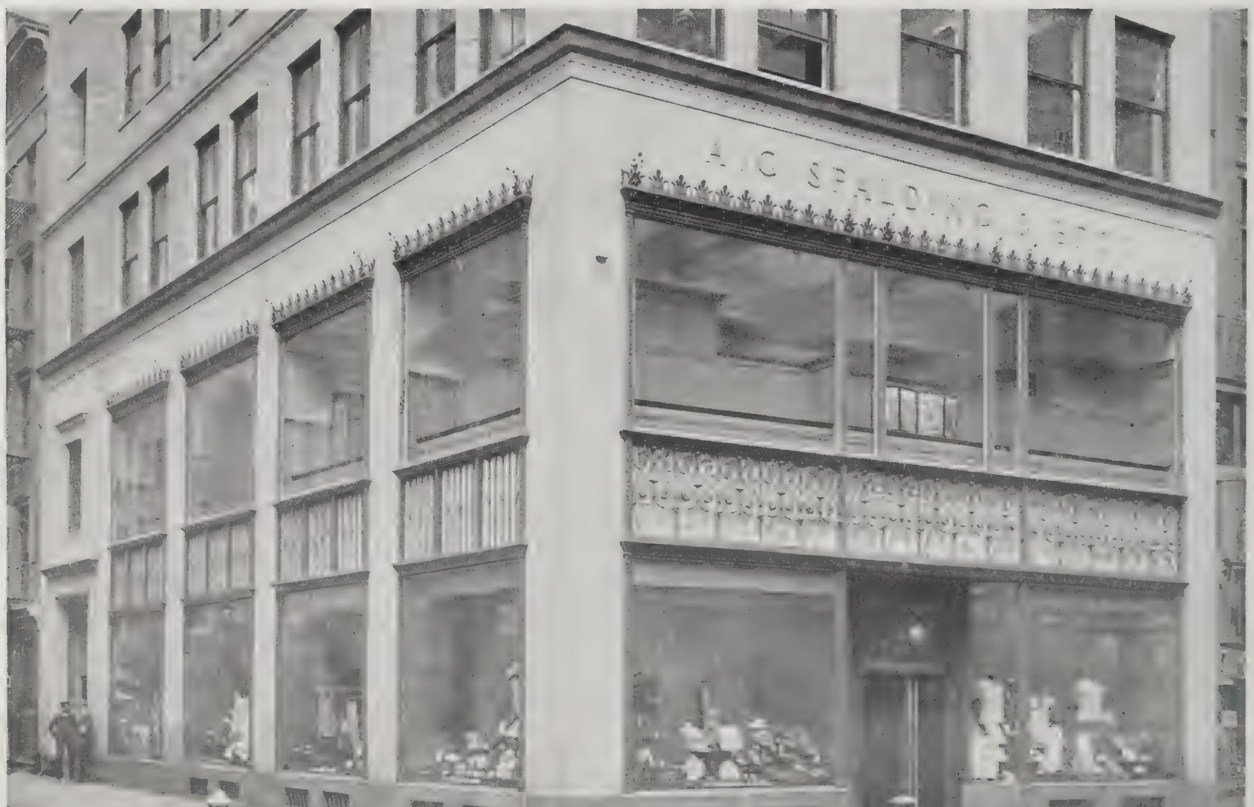
In the center of the store on one side are cabinets for muslin underwear, silks, waists, sweaters and



**Suggestion for Planning a Small General Store (Scale: $\frac{1}{16}$ inch equal to 1 foot)**



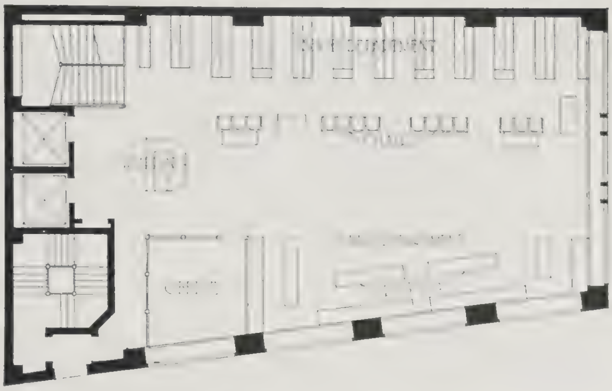
VIEW OF A SALES FLOOR, SHOWING COUNTERS AND WALL CASES



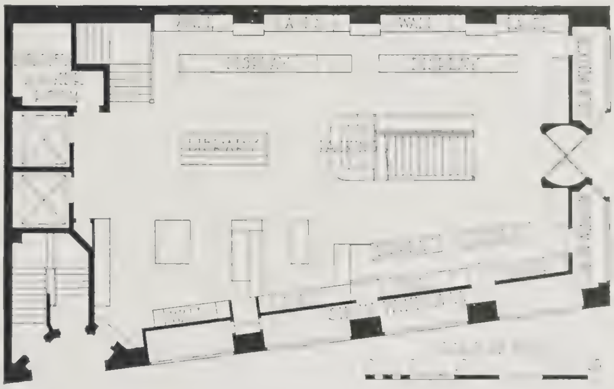
EXTERIOR, STORE FOR SALE OF SPORTING GOODS, NASSAU STREET, NEW YORK
BENJAMIN WISTAR MORRIS AND LOUIS S. WEEKS, ARCHITECTS

patterns, while the other side is devoted to yard goods and women's and children's shoes. Here also are specially built showcases and counters. Back of the window on the left-hand side of the store is located the toilet goods section. This entire side of the shop is given over to women's ready-to-wear garments, and millinery. In the rear of the store a center counter is provided for stationery and books. The house furnishing department, office and alteration room, also in the rear, complete the shop layout.

In designing a drug store, if the cornice line of the fixtures is carried around the entire room on an even line a very attractive effect is produced. In the accompanying plan, there is nothing shown on the right-hand wall except what is known as an "English buffet case" and telephone booths. The telephone booths are placed in the rear so as to compel the patron to walk the full length of the store, because if the cases are attractively arranged it may mean a sale before the person who came in only to use the telephone leaves. On the left-hand wall are a soda fountain, tobacco wall case, patent medicine section, cigar showcase, candy showcase and the wrapping counter. On the rear wall is open shelving with built-in sink and drain boards. The prescription section has a display front for perfumes, powders, etc., and is connected by arches to the telephone booths on the right-hand side of the store. The patent medicine section is on the left-hand wall. Soda tables in the center of the room complete the

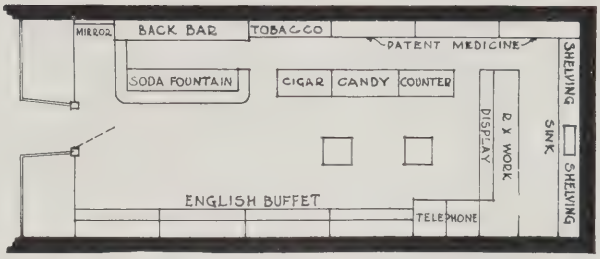


Plan of Second Floor



Plan of Main Floor
Shop of A. G. Spalding & Bros., New York

View of a Well Arranged Floor for Sale of Men's Furnishings layout of the drug store.



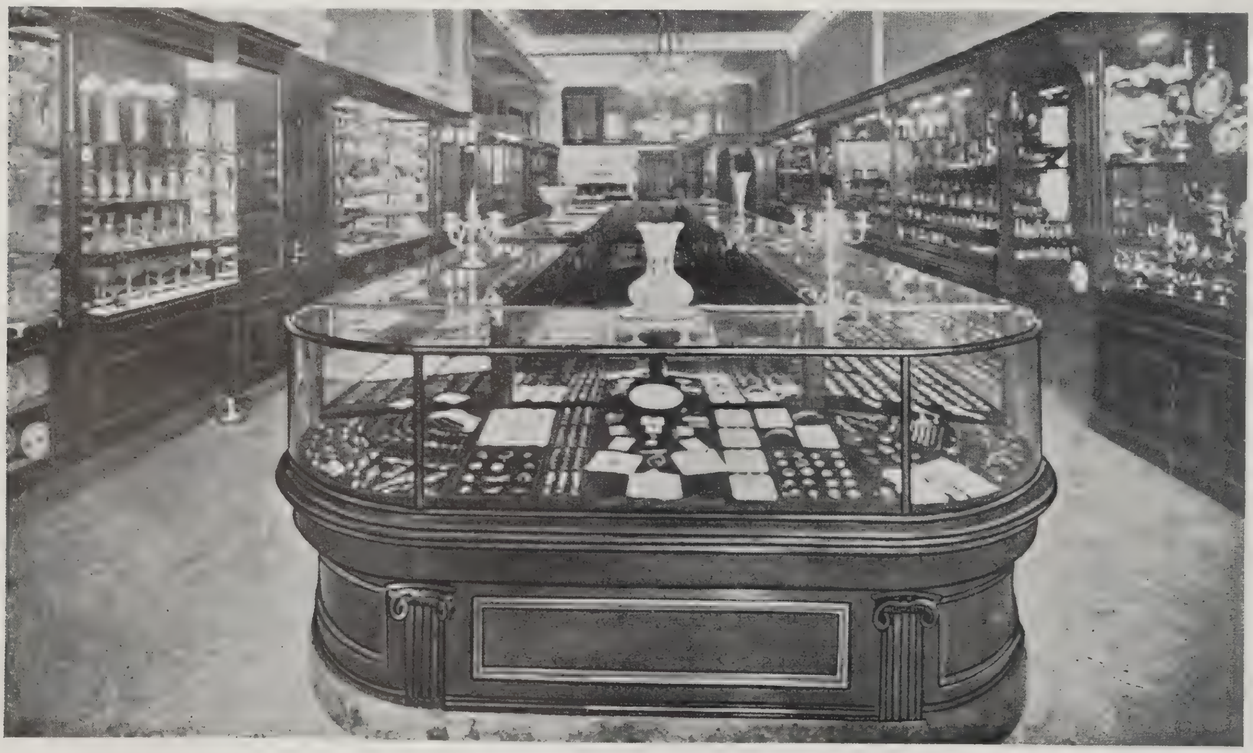
Suggested Plan for a Drug Store

If the designer is working on a jewelry store it is advisable, if the shop is a large one, to have a diamond room in the front on one side and a watch repairing department on the other. Showcases for jewelry laid out in horseshoe form in the center of the room make a fine appearance, and the silver and flat wear are carried in wall cases running on each of the side walls. Great care should be taken by the designer to see that everything in the store harmonizes, since poor taste in painting or decorating the walls or ceiling would spoil the appearance of the entire store.

Should one be called on to design a sporting goods store, unless the designer has had previous experience I am afraid he would have quite a job on his hands, since every article of any size requires a different kind of wall case to display it; so it would be well to secure as much information as possible from store fixture manufacturers who make this class of fixtures, before starting to lay out this type of store, in order to make it successful.

There has recently been completed by Benjamin Wistar Morris and Louis S. Weeks, architects, what is considered one of the finest sporting goods stores in the country. This is the store for A. G. Spalding & Bros., Nassau Street, New York. From the window backgrounds to the third floor it was designed by the architects and is thought to be the first store of its kind for which architects were employed to design all the display equipment. The basement of this store is devoted to baseball, football, skates and bargain departments. The first floor has specially built cases for sweaters, jerseys, bathing suits, clothing, etc. Specially built cases for the display of tennis racquets and shoes are found on the second floor. On the third floor the golf enthusiast will find clubs, bags and everything needed for this sport, also the gymnasium department, as well as polo and various other departments for sporting equipment.

It is suggested that when architects design store fixtures they pay particular attention to the window backgrounds, as the show windows are one of the merchant's best assets, and if attractive they will sell more merchandise than any salesman in the store. Attention must be given to the class of merchandise to be displayed, since a French designed window back which would be just right for a women's ready-to-wear department would not be the proper setting for the display of jewelry. Care and thought expended on the designing of fittings for shop windows and shop interiors are abundantly worthwhile since, in the first place such fittings when once installed are likely to be used as long as the shop exists, and also because nothing is more important to the appearance of the store than fittings which are so constantly seen. They can make or mar the entire shop.



Interior of a Jewelry Store; Wall Cases for Silver; Showcases for Jewelry

# Heating and Ventilating of Shops and Stores

*By* EDWIN L. COLE

THIS is a widely varying problem, ranging from simple to complex with the character and size of the particular project. All stores of course require heat, but not all stores need mechanical ventilation. Generally speaking, the small or medium sized specialty stores, such as drug, men's furnishings, trunk stores, etc., need not be ventilated as they are rarely crowded; the area is large compared with the number of occupants assembled at any one time, and the entrance and exit doors furnish ample means in most cases for thorough airing out, this in contrast with stores of large floor area in proportion to the outside exposure, in which effective airing out is impossible, as in department stores.

The superiority of vapor heating over the old style low-pressure steam system is so well established that it needs little comment here. Assuming a choice of system that is durable and simple, vapor heating is much more economical, and is free from the limitations so frequently experienced with low-pressure steam. Overheating is one of the evils common to the haphazard treatment of stores, and one that is least generally recognized. It is a source of discomfort, a menace to health, and a deliberate waste of fuel. Therefore it is of major importance, in designing the plant, to give this proper consideration. It is necessary, of course, to have sufficient heating capacity for the severe cold weather, but this will overheat the store much of the time if not properly controlled. Therefore it is essential that all the heat provided should be adequately controllable in some simple way. In the small store, with few units of radiation, it is wholly practical to depend upon the modulating supply valves used with a vapor system to heat each radiator as much or as little as the outside temperature demands. It will be found very helpful and a worthwhile economy to display a number of thermometers in conspicuous places to give the clerks ample notification of the temperature or the need to control it, and to make some one person responsible for the prevention of overheating. During the war many firms practiced this fuel-saving measure, and savings in fuel consumption as high as 20 per cent were common, much to the surprise of those who tried it. In the larger stores, however, particularly department stores, hand regulation of temperature is impractical, and in all cases the cost of automatic temperature control equipment is fully justified. This should be as simple as possible and the best and most durable equipment obtainable. It is a good investment and not in any sense a luxury.

The location and type of radiation depend upon the character of the store and its equipment and fixtures. The cheapest and most efficient type is direct radiation installed as near the cold exposures as space will permit. In specialty shops with artistic interior treatment, where appearance is important, an excellent arrangement is suggested in Fig. 1. This is a circulating, indirect stack, taking its air from the floor down to the indirect radiator casing, and discharging heated air through a duct built into some available space in a case, cabinet or shelving, the discharge outlet being through the top of the case, or if this is too near the ceiling, then out through the face well above the headroom. This method draws the coolest air in the room from the floor and brings the warmer air at the ceiling down to the floor.

The treatment of the main entrances of small stores is always a problem, as there is not always room for an ample vestibule. Revolving doors are a great assistance in preventing cold drafts and are economical of heat, as they admit a minimum of cold air. It is necessary that space be provided for ample direct radiation close to such entrances. In large department stores there is opportunity for providing deep vestibules and sufficient justification for them. They are a distinct economy from a heating standpoint and make possible the control of cold air currents. They should be at least the full depth of the show windows, and the sides form very effective show window space. It would seem that the tendency to take shelter in vestibules is encouraged by the management of many large department stores, as it insures inspection in comfort and at leisure.

With such an entrance several methods of heat treatment are possible that make all the air entering the store warm and fresh; this is particularly true where revolving doors are used. Circulating indirect stacks, located directly under the vestibule, discharge through large grilles in the sides of the vestibules in the space under the windows near the inner doors. The air supply to these stacks comes through grilles in the outer halves of the same spaces. This tends to draw the entering cold air into the downdraft grilles, to some extent working against its direct flow toward the inner doors; and the flow of hot air out into the vestibule near the inner doors, in large volume at high temperature, is drawn into the store at a comfortable temperature. This treatment gives insurance against freezing, always a possibility with direct radiation. The temperature of vestibules should never be controlled automatically, for the same reason.

In case the management objects to large vestibules, it is necessary to have a large amount of direct radiation in as close contact with the path of cold drafts as the arrangement of the store will permit. It will be a makeshift arrangement at best. One treatment that has met with some success in such cases is to construct a glazed partition in the aisle opposite the entrance doors, with a large amount of direct radiation on the side toward the doors. The cold air rushing in comes in contact with the hot radiators, and being forced to change its direction,

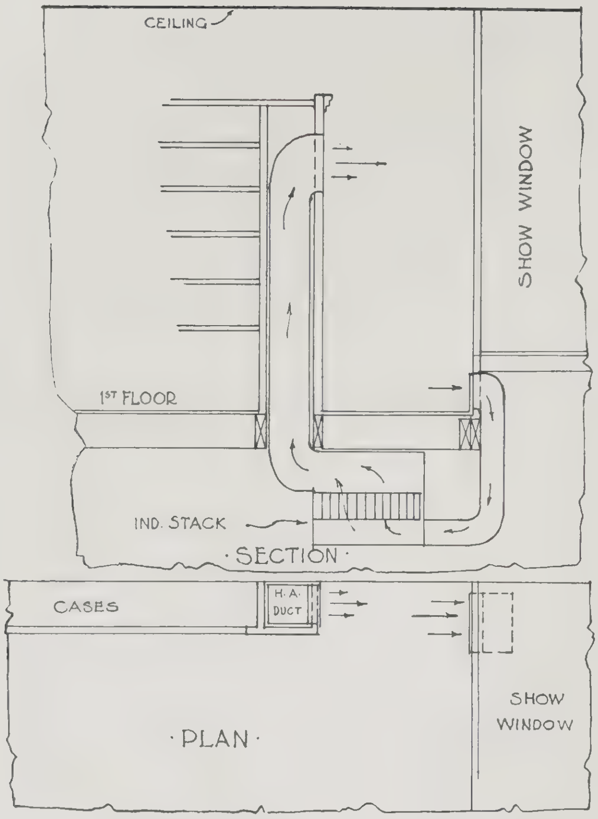


Fig. 1. Suggestion for Air Circulation

becomes to some extent mixed with the hot air in this space. In the case of small vestibules with outer and inner doors, space might be provided between the inside doors and banks of narrow, high wall radiators installed in these spaces. Revolving doors are almost an essential in the two latter cases. They are very effective mixers of hot and cold air.

It is important to prevent show windows from "steaming" and freezing when the show space is open to the store. Such a condition requires some effective heating surface as close as possible to the glass to evaporate the moisture in the air faster than contact with the cold glass can condense it. A number of methods have been successfully employed. Coils of pipe may be installed immediately below the floor of the show space with perforations or slots in the floor close to the glass line, permitting heat to come up over the surface of the window. Space may be provided for a large percentage of the radiation required for heating to be installed near the windows just outside the show space. If the show windows are partitioned off from the store and kept at a low temperature, there is less moisture in the air, as these spaces are little affected by the air in the store; and the more equal temperature between the inside and outside air prevents the cold glass from condensing what little moisture there may be.

The air conditioning of very large floor areas with proportionately small outside exposures, as in the large department stores, is a much more complex problem than in the small shop. There is the tendency to overcrowd. Also shoppers spend more time in such stores and feel the effects of poor air conditions much more. There is ample testimony from both men and women shoppers to establish the fact that the condition of the air in the average department store is uncomfortable and enervating, tending to make shopping a wearisome ordeal despite its manifold fascinations. Without doubt, if the air in any large department store were kept fresh and stimulating, the contrast with the average condition would be so noticeable that it would occasion wide and favorable comment.

The first step in the solution of this problem is to determine what makes the air so uncomfortable, and having arrived at the cause, the remedy is at once simpler of solution. As previously indicated, overheating should be placed first on the list of causes. Most stores are much too hot for comfort and health. Nothing is more enervating than too much heat. Second in importance is vitiation. Stale or foul (unfresh) air at any temperature is unwholesome and quickly affects one with a sense of discomfort, with good reason. Commenting on the first of these causes, overheating, there is no excuse for this, regardless of the fact that it is so general. No interiors of the character under discussion should ever be heated to over 68°, and even a lower temperature would be found more wholesome for the clerks and certainly for the shoppers if the temperature were kept uniform, not allowed to rise appreciably at times and then be cooled down again. The first step, then, is to control the temperature of the air to a minimum, comfortable for clerks who are lightly clad and must be the deciding factor of minimum temperature. It may be assumed that the system has been properly designed for a possible 70° in the average coldest weather. Automatic temperature control apparatus is the only means available for holding the temperature always at the desired point. Such equipment is indispensable to the effective solution of the problem. If the management of any department store could have demonstrated for it the saving in fuel consumption, through using only what is necessary to keep the areas constantly at the desired minimum temperature, and the effect on sales efficiency of the increased mental and physical alertness of the clerical staff, to say nothing of the effect on the public, it would consider such equipment a vital necessity. And it is quite simple to accomplish it with the highly developed equipment available.

The second cause is not so simple to treat. It is an accepted fact that the one great natural purifier of the air is the sun; that the sun's rays must shine directly through and into air to accomplish its purifying result. Vast areas in this type of building are never reached by the sun, and depend almost wholly on artificial light. Furthermore, the area of the floors in proportion to the area of windows that can be opened is so great that buildings of this class largely contain the same air day in and day out, there being only a slight natural air change as compared with other types of buildings. Morning finds the same stale, contaminated air in the building that was left there the night before, particularly in the winter. Effective "airing out" is practically impossible. Nor can the sun get at this air except in a very small part of its area. This is particularly true in basements and even on street floors some distance from the entrance.

It is out of the question to attempt to describe in this article the various applications to such a problem of air handling equipment except in a general reference to a few of the possibilities.

*Exhaust.* Elevator shafts must be enclosed. This makes possible the provision of a separate enclosed space or shaft at one end of each battery of elevators, fireproof and extending from the basement floor to a point well above the roof. Its area must be ample for the work it will be expected to perform. Suitable openings into this at floors or ceilings or both, depending on the particular space treated, can be provided with a duct from each extending up this shaft a sufficient height to prevent communication between floors. The tops of these shafts should be provided with hoods suitable for the egress of air and the exclusion of weather. Such shafts could be made to serve an appreciable portion of the area. Whether they would be sufficient exhaust for the whole, or whether it would be necessary to provide additional mechanical exhausts for portions remote from them, are questions that can be answered only by the study of each individual case. If it were decided to use both methods, care must be exercised to avoid the possibility of one working against the other; this is another problem for individual study.

*Fresh Air Supply.* Two major methods of effective supply are available, but their application must needs be so diversified and so dependent on the design and arrangement of the building that suggested treatment must be general.

*Central Fan System.* A special room is required for the fan driving motor and heating coils. For large floor areas it may be necessary to have more than one fan, particularly if both the basement and the first floor are to be served. These apparatus rooms may be located anywhere in the basement that space can be allotted for the purpose, but it is some advantage to have them not too far removed from the boiler plant. This is not a difficult problem usually, as they can be located in parts of the building remote from sales space. The source of fresh air supply should be the roof, and one or more shafts provided to conduct it to the necessary points for warming and distribution.

*Distribution Ducts.* It is an entirely different matter to find suitable spaces for the trunk line and branch supply ducts through the rooms; unfortunately, many forms of building frames do not lend themselves to concealment of ducts. If it were not for this it would be a simple matter as a rule.

At this point let us understand clearly what is really required in the way of ventilation. For years it has been supposed that if the air in a room were changed so many times an hour all that was necessary or even desirable had been accomplished. This is a fallacy that is still clung to in many quarters, but it will never solve the problem of the large department store. While it is true that it is necessary to remove stale air and replace it with fresh outdoor air, that is but a small part of the problem. The important factor which is less commonly realized and usually neglected is circulation or movement and diffusion within the room. To be "alive," stimulating and refreshing, all the air in the room must be in active motion. Not in "paths" or currents that will cause uncomfortable drafts, but with a "breaking up" or mixing effect, the air in the room being sprayed constantly with the incoming air all over the room. This can be done successfully only by introducing the air at a high velocity in a vertical direction with the effect indicated by the arrows in Fig. 3. The inlet orifices must be distributed properly to avoid confliction; the velocity must be in proper relation to the distance of the inlet orifice from the ceiling, and all orifices just the right distance up from the floor to produce the aspirating effect shown in Fig. 3. The importance of this last feature cannot be overestimated. It makes the difference between success and failure.

To give a concrete example of one good method of designing and concealing ducts, we will assume a framing construction favorable to our purpose: mill construction of concrete slabs with supporting beams all running in one direction and spaced about 8 feet

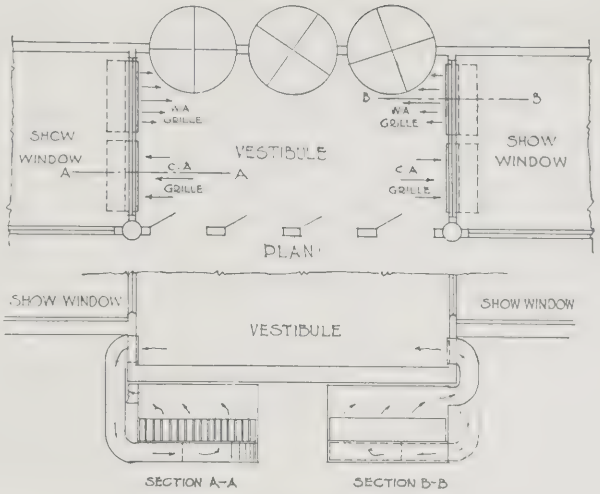


Fig. 2. Arrangement of Radiators and Doors

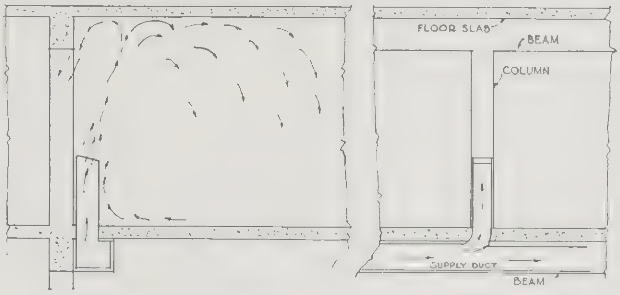


Fig. 3. Plan for the Diffusion of Air

on centers, with square columns under the beams. We will now attempt to describe the design of a supply duct system for a portion of the floor area. At some point available within this portion install a vertical main duct to supply all floors to be ventilated. On the ceiling of each floor install a branch from the vertical duct located beside one beam and furred in with it to give the appearance of a wide beam. From the top of this duct a vertical branch will be run up through the floor against each column above and furred in with it. Each of these branches will extend not less than 4 feet above the floor and terminate in an open end pointing up to the ceiling. Each of these supply outlets will be made to serve about 90 square feet of floor space. The velocity through each outlet will be proportioned to its distance down from the ceiling, possibly 800 feet a minute. Referring again to Fig. 3 we see the effect of this treatment on the air in the room. A slight air pressure is thus created in the room which steadily pushes air toward and out through all exhaust openings and tends to stop infiltration around windows. The temperature of the entering air is automatically controlled to prevent the room temperature from rising above the desired point, and volume dampers installed in the supply ducts should be set to maintain a uniform distribution of air in all outlets. Additional heating surface in the form of direct radiators may be installed, either exposed or encased, to provide for heat losses, these being automatically controlled as already suggested. This treatment, or a modification of it to fit varying conditions, would insure a wholesome, bracing atmosphere in the spaces treated.

*Unit Ventilator System.* Developments of recent years are the unit ventilators. These stand in the rooms they serve and can be installed against outside walls or against the shafts that conduct fresh air down from the roof. They take their air in at the back, and discharge it vertically as described for the other system. They give the same result in the room and eliminate the supply ducts altogether. They can be automatically controlled as to air temperature, can be operated together or separately, and by switching on a damper the air in the room can be re-circulated through them for warming up in the mornings and after holidays. They are compact, flexible and effective and an excellent solution of the problem wherever applicable. They are supplied with piping like a direct radiator.

*Basement Sales Rooms.* The "bargain basement" is an institution that has probably come to stay, and it has introduced a new problem to the ventilating engineer. It is wholly dependent upon mechanical ventilation, is often crowded to the limit of its capacity, and is an extreme air conditioning problem from every standpoint. Some heat is of course necessary, but this need is small in comparison with that of ventilation, and in the writer's judgment should be introduced with the fresh air. It is necessary to warm the entering fresh air sufficiently to prevent discomfort, and this heat alone will usually be more than sufficient as the volume of air supplied must be large. Here again it is important to use automatic temperature control, as overheating is one of the chief problems in such basements. The thermostats should be graduated action type, generally cutting down or increasing the amount of heat introduced into the entering air as conditions require.

*Basement Exhaust.* Not only foul air but excess heat must be disposed of, and it is advisable to design the exhaust ducts with ample outlets at both the floor and at the ceiling, as at times the animal heat alone will cause overheating, particularly in mild or warm weather. The ceiling outlets should be fitted with dampers that normally will remain closed, but when opened will close off the ducts leading up from the floor outlets. These dampers should be automatically controlled from the same thermostats that control the heat supplied to the entering air, the thermostats being compound and arranged to first close off the heat and then, if the temperature continues to rise, to open the ceiling outlet dampers.

It would be a distinct advantage to have the main ducts run in trenches under the basement floor, with the supply branches extending up about 4 feet above the floor as described for the upper floors. But if this is not possible the ducts may be run on the ceiling with the branches so located (over cases, etc.) that they may branch down from the main duct at an angle of about 45° from the ceiling for a short length, and then sweep upward, discharging on a 45° angle toward the ceiling. Here again it may prove advantageous to use ceiling type unit ventilators and do away with the ducts. If the floor beams all run in one direction, the ducts can run beside them and not interfere with headroom, the appearance being the chief objection. But if the framing for the floor introduces cross beams cutting the ceiling into square bays, the ducts must be below these cross beams which will make them uncomfortably low. It will be seen that it is worth while to give careful thought to the ventilating design before determining the floor framing on any floor.

It seems appropriate to add a word here regarding the operation of the ventilating equipment. While the building is being cleaned the supply system should be shut down and the exhaust system operated to full capacity. At all other times, when the store is closed, the exhaust ducts should be closed tight to conserve the heat and prevent back drafts of cold air into the building. The entire system of supply and exhaust ventilation should be operated to capacity for at least one hour before the store opens for business every morning.

Little attempt has been made in this article to describe all the applications of heating and ventilating design that it might be possible to utilize. The writer's purpose has been more to bring out the fundamentals of these two problems, and to offer in some detail a description of at least one method of treatment that in his judgment is better than many others which are more or less in use.

# Three Modern Parisian Shop Fronts

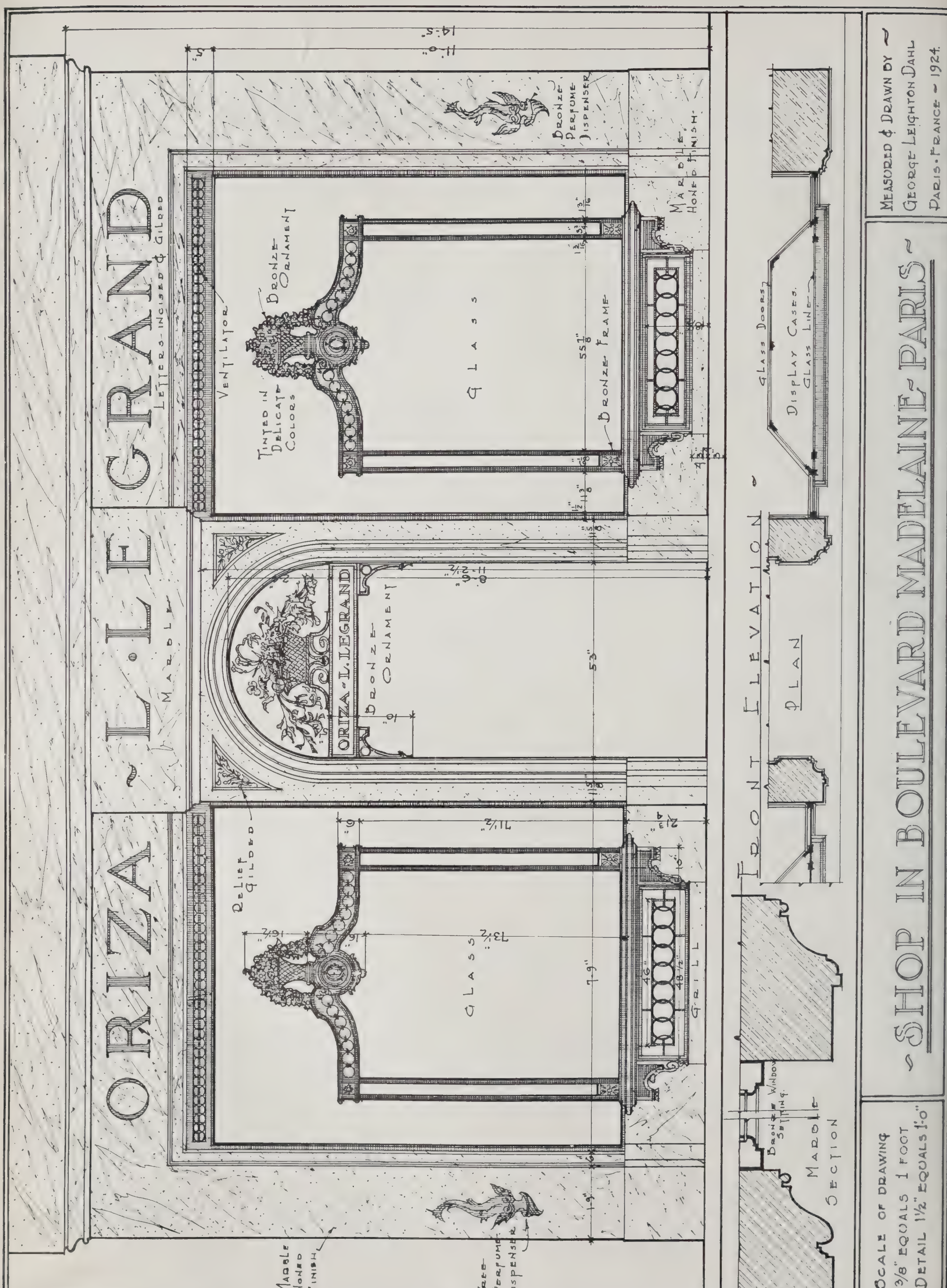
## With Measured Drawings

### *By George Leighton Dahl*

WITH the rumbling of steel and the groan of chains, the barricade is lifted; what appeared to be a cold and cheerless prison has now been transformed into an attractive shop front. Every morning and night the rolling steel shutters are raised and lowered to guard the merchant's shop. "Plate glass offers no protection," he says. Possibly the days of the Bastile are still in his mind. However, with the advent of modern business methods and advertising, the Nemesis of the rolling steel shutter seems to be near; in fact, its passing is accomplished, for as we promenade the avenues and boulevards we are attracted by the shop windows now relieved of the encumbrances of other days.

Paris, the city of fashion and art, is essentially also a city of individual exclusive shops, which cater to the thousands of visitors and buyers from all parts of the world. The shopkeeper is constantly endeavoring to invite their attention. In order to properly present his wares he well appreciates the necessity of creating an outward distinctive atmosphere, an architectural symbol, an index to his business.

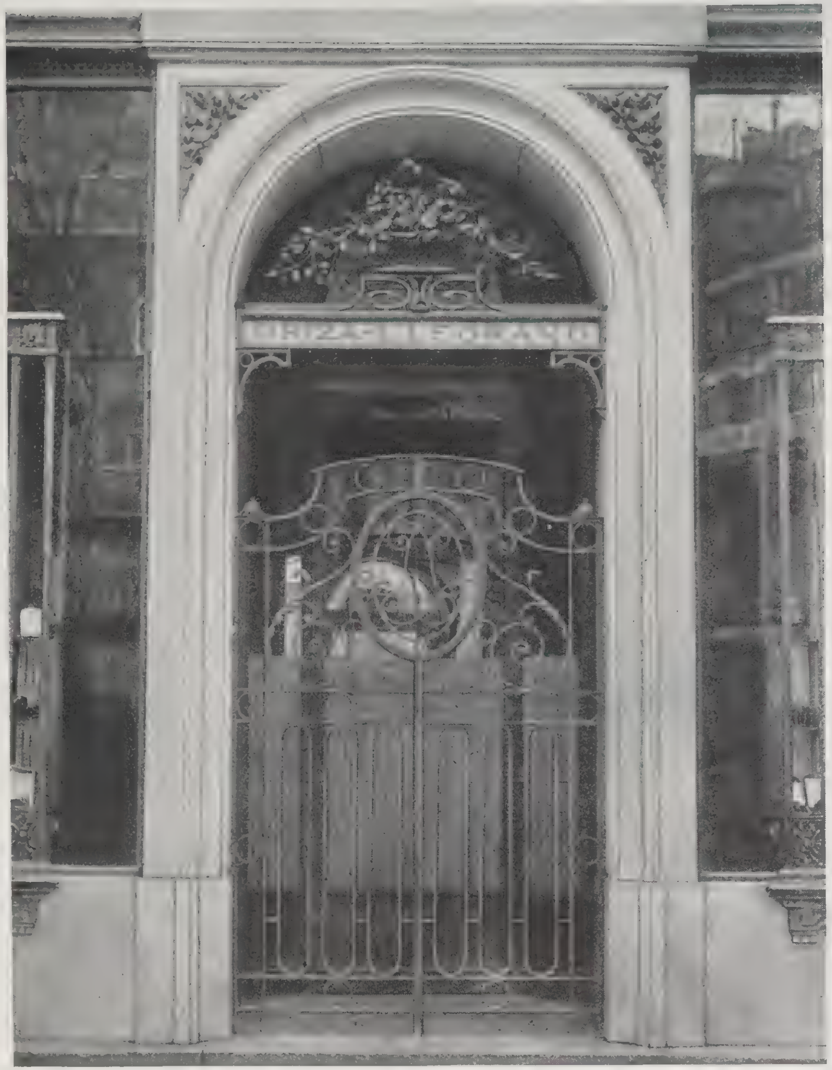
EDITOR'S NOTE. Successful retail merchandising involves primarily a series of visual impellents which hold attention for a sufficient period of time to establish the dual connotation of attractiveness and dependability. With camera and measuring tape George Leighton Dahl here has interpreted and defined the subtle impulse which good architecture lends to the modern shop fronts of Paris.

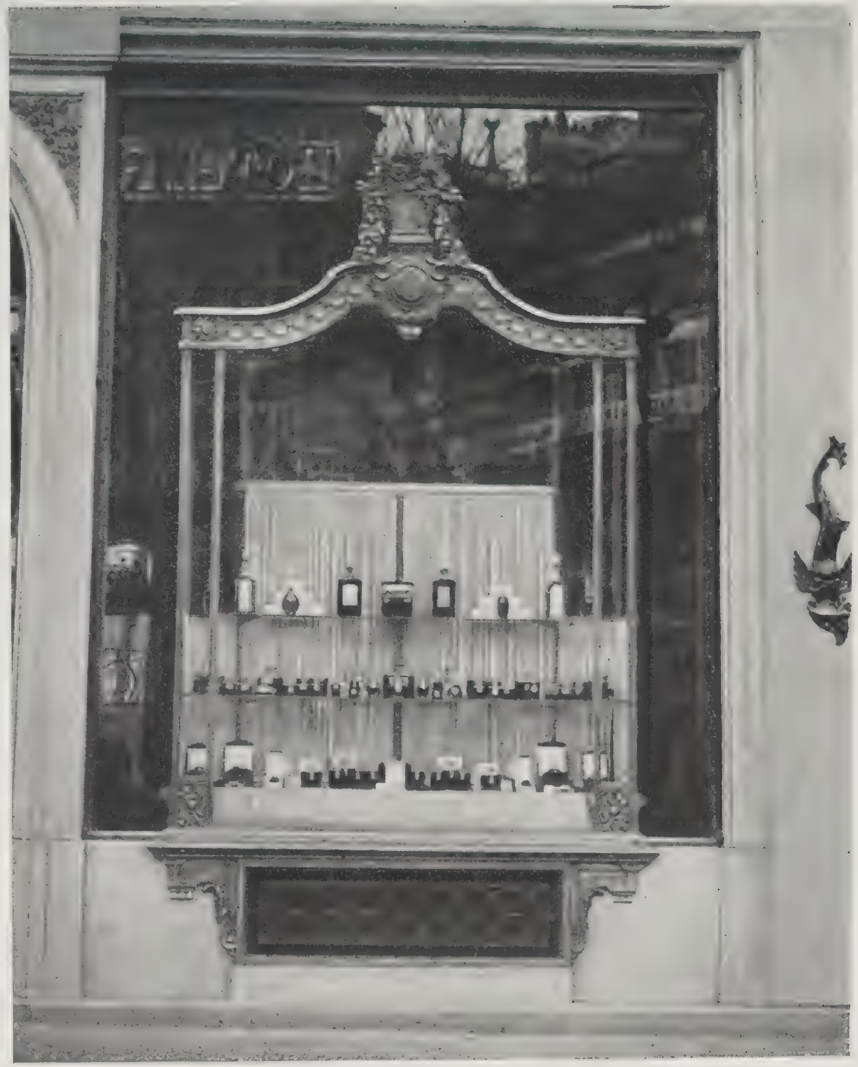


~ SHOP IN BOULEVARD MADELAINE-PARIS ~

Measured & Drawn by ~ George Leighton Dahl
Paris. France ~ 1924.

Scale of drawing 3/8" equals 1 foot
Detail 1 1/2" equals 1'-0"





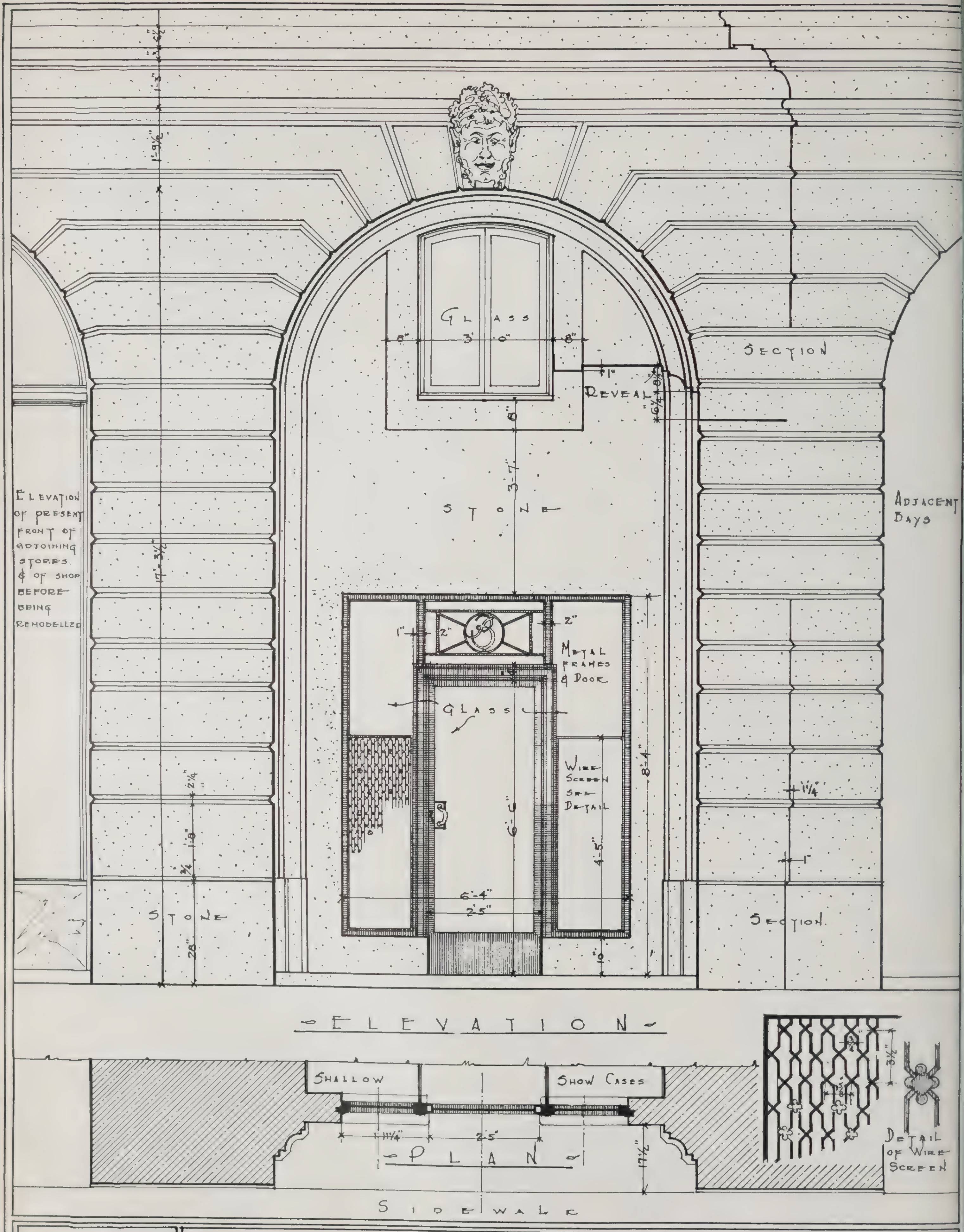
# The Perfume Shop of Oriza L. Le Grand

Grand Boulevard, Paris

*Text and Measured Drawings*

*by George Leighton Dahl*

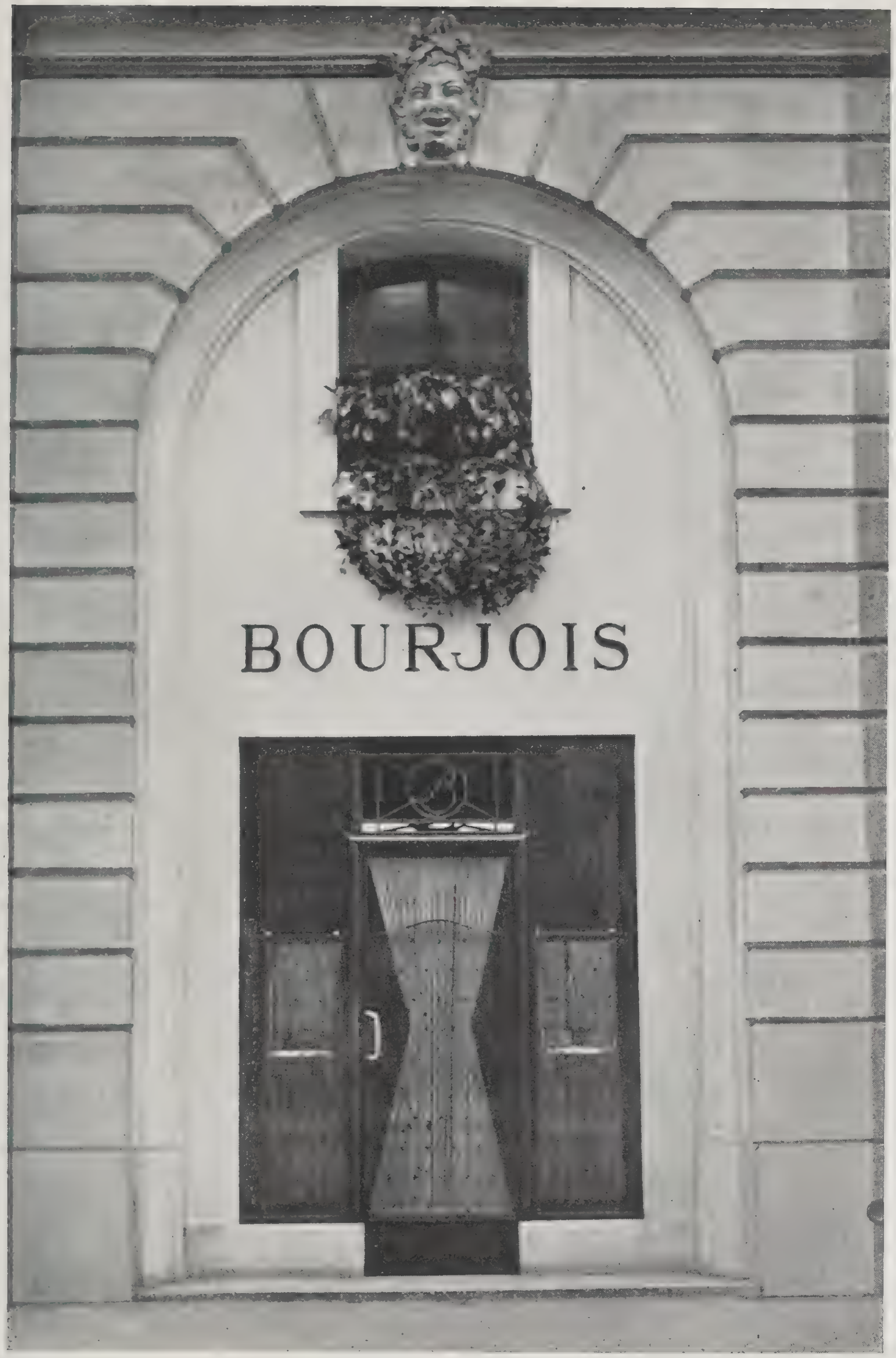
OF the newer shops that grace the *Grand Boulevard* possibly the most interesting is that of Oriza L. Le Grand, dealer in choice perfumes. It is a delicate little shop, an artistic creation where the handling in the combination of marble and metal is very successful. The material of the structure is a honed-finished siena marble with gold metal bronzework and hammered metal flowers, slightly tinted. The blending of colors and material, tempered by reserve in design, stamps this shop as distinctly expressive of its purpose. An interesting feature is the application on the pilasters of the facade of two bronze dolphins which dispense perfume gratis to the public. Incidentally, these dolphins are very busy.



REMODELLED FRONT
SCALE 3/8" = 1'-0"
DETAIL SCALE 1½ : 1'-0"

# SHOP IN RUE DE LA PAIX - PARIS

MEASURED & DRAWN BY
GEORGE LEIGHTON DAHL
PARIS • 1924

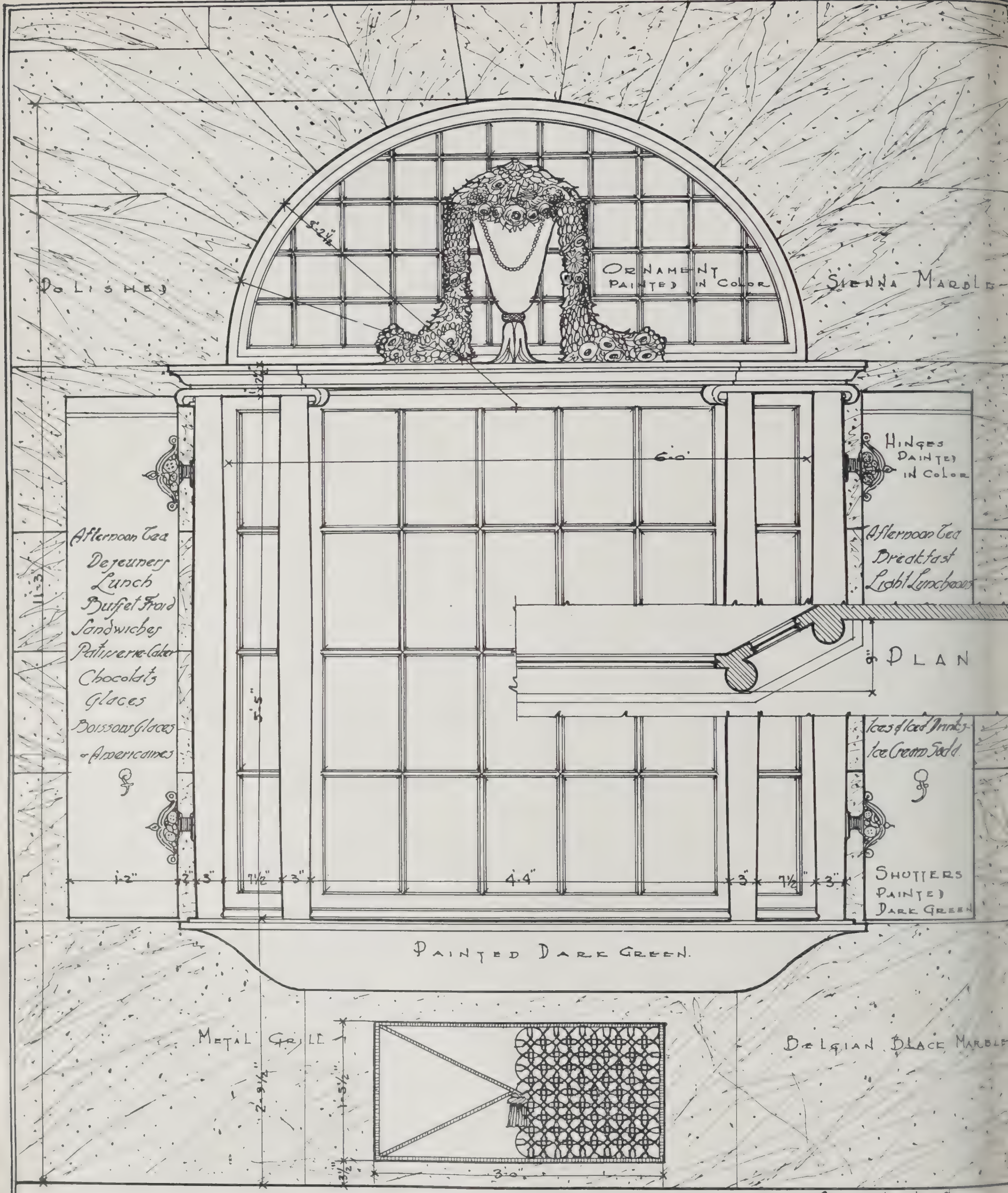


# The Jewelry Shop of M. Bourjois

27 Rue de la Paix
Paris

*Text and Measured Drawings*
*by George Leighton Dahl*

CONTINUING along to *No. 27 Rue de la Paix*, this fashionable avenue, long famous for its jewelers', perfumers' and dressmakers' establishments, is the shop of Bourjois, dealer in fine jewelry, occupying one of the arches of a continuous arcade adjacent to the *Place Vendome*, designed by J. Hardouin-Mansart in 1708. In the designing of this shop difficulties were many, as government restrictions forbade the altering of the structural or outward appearance of this old *monument historique*. With these limitations the architect succeeded very well in surmounting the obstacles; as will be noted in the drawing, the structural and outward appearance is entirely intact. Attention was devoted to a simple dignified design within the arcade, of white limestone with black metal window and door frames. The whole composition is tied together by a series of jamb mouldings; the treatment is very flat, affording a pleasing contrast to the heavy pier and arch rustication. This shop is one of the most striking on the avenue.



MATERIALS —
POLISHED SIENNA
MARBLE ABOVE
BELGIAN BLACK MARBLE

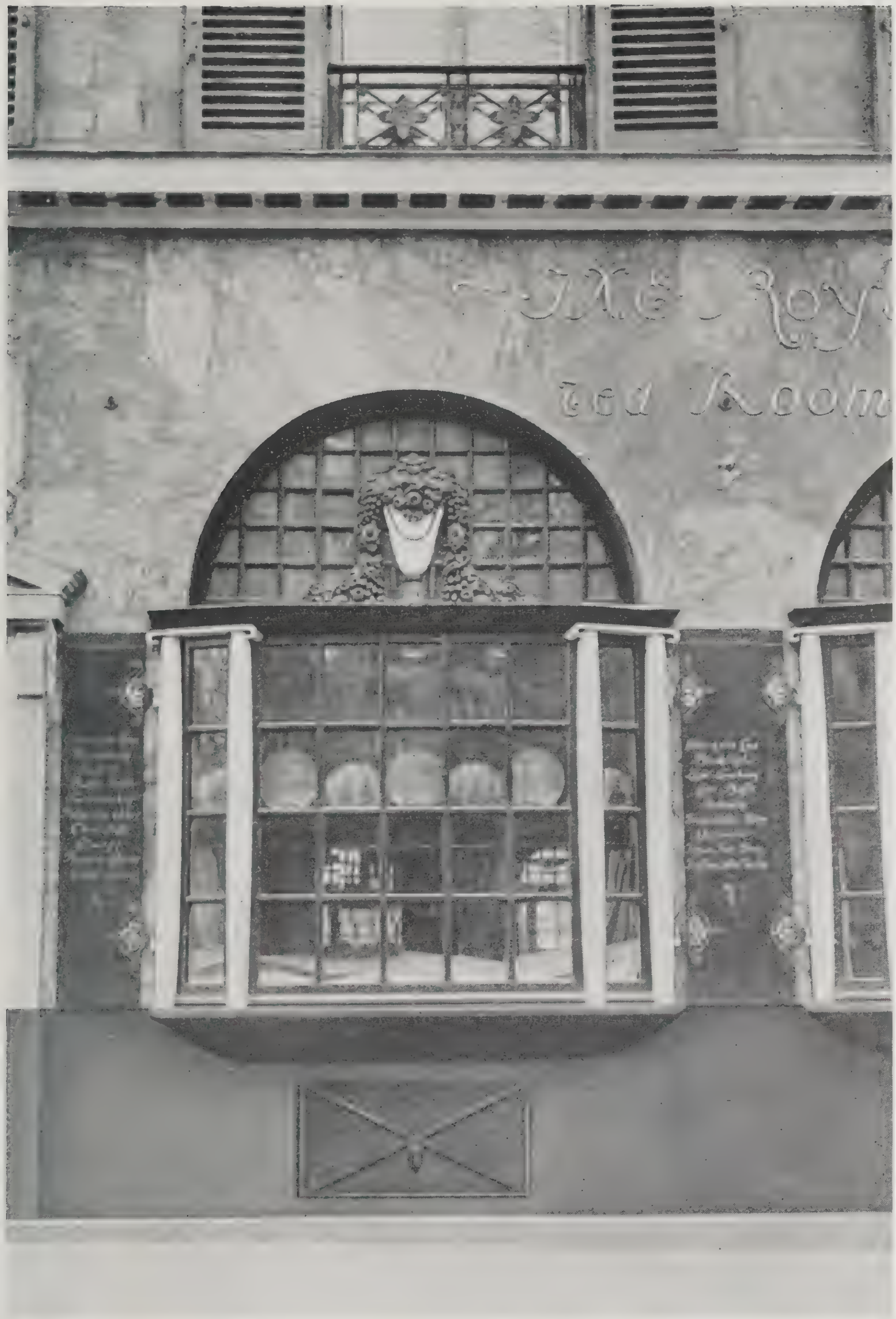
## ELEVATION OF WINDOW

BASE & WINDOW WOOD
WORK PAINTED; WHITE
COLUNNETTES; DARK GREE
TRIM. ORNAMENT IN COLOR

SCALE 3/4" = 1 FOOT

# SHOP IN RUE ROYAL-PARIS

MEASURED & DRAWN BY
GEORGE LEIGHTON DAHL
PARIS. FRANCE ~ 1924



# Royale Tea Rooms

## Rue Royale, Paris

*Text and Measured Drawings*
*by George Leighton Dahl*

DUTCH COLONIAL has had its introduction into Parisian life. The facade of the tea shop in the *Rue Royale* is a happy combination of painted wood and polished siena marble. The character of the design is expressive of its purpose as an inviting *patisserie*. The facade is pierced by two flat circular beaded openings, framed in with four colonnettes on a projecting window sill, crowned by a vase and flower ornament delicately tinted in color, with decorative shutters reminiscent of Dutch influence. In ten minutes you will find yourself seated within, at a table with a pot of chocolate, which is evidence enough of the architect's success in creating an inviting exterior!

# Recent Necrology

## BERTRAM GROSVENOR GOODHUE

IN the recent passing of Bertram Grosvenor Goodhue architecture lost one of its outstanding figures. Mr. Goodhue was essentially a creator, and therefore he was a student,—one who by grasping the fundamentals of a subject and absorbing its spirit was able to carry its development to where it logically led. This strong foundation of understanding furnished support for a soaring structure of achievement. Without ceasing to be original and at times even daring, there was inherent in all his work a high degree of architectural quality—a character which pervaded his work of the most divergent kinds and which stamped it with the mark of his individuality and genius.

Born April 28, 1869 at Pomfret, Connecticut, he was attracted early in life to the profession of architecture. It was before the days when many excellent schools of architecture which now exist smoothed the path which leads to its profession, and the student who aspired to architecture was obliged to enter as a graduate of the school of experience. Mr. Goodhue's architectural training was begun the day he entered the office of Renwick, and it might be said to have ended only upon the day of his death. As a member of the firm of Cram, Wentworth & Goodhue, later Cram, Goodhue & Ferguson he played a powerful part in leading the advance of that firm to a place in the foremost rank of church architects. When the firm was dissolved in 1914 Mr. Goodhue began independent practice which afforded wide scope to his many-sided genius. Without ceasing to be chiefly a church architect and master of ecclesiastical styles, as represented by the Gothic of St. Vincent Ferrer's and the Chapel of the Intercession or by the Byzantine of St. Bartholomew's, he explored more distant fields, among them the Spanish Renaissance, which with his enthusiasm for Spain and things Spanish he used supremely well. In later work he turned toward fields still more distant;—just where his genius would have carried him will never be known, but any feeling of misgiving or tendency to criticise the daring originality with which he sometimes approached a work was curbed when one remembered the unfailing good taste with which Mr. Goodhue solved difficult problems.

Along with his eminently successful practice of architecture went great skill along certain other lines of work which might be called "collateral." His sketches, many of which were published in book form, show a marvelous grasp upon each of the qualities which enter into the making of excellent sketches, and his work, whether in pencil, pen and ink or some other medium was altogether winning and charming, representing a genius for style as characteristic and marked as that which distinguished his work in the more immediate field of architecture.

But to one who knew Mr. Goodhue there will often come a recollection of one phase of his many-sided personality which was particularly his own;—his encouragement of talent where he knew it to exist or where he supposed it might exist, and his kindness and sympathy toward those possessed of little talent, perhaps none at all, but anxious to "do things." Workers in all the many arts which have to do with architecture,—sculptors, woodcarvers, glass painters, metal workers and others,—will testify to the encouragement which they received from him; editors, writers and other workers in magazine or newspaper fields never appealed to Mr. Goodhue or to his office without receiving that courteous coöperation and unfailing consideration which lightened their labors.

## LOUIS H. SULLIVAN

BORN in Boston, September 3, 1856; died in Chicago, April 14, 1924." In these few words there might be condensed the obituary of an architect long identified with the progress which the profession in America has made during the last few decades. Louis Henri Sullivan was essentially an exponent of movement and activity. His was not a reverence for architectural styles as such, but rather an interest in what they taught and particularly what could be adapted to contribute to the evolution of a new architectural type which should be expressive of the present age. The believer in views so pronounced and methods so advanced could not but attract to himself the dissent of many as well as the admiration of others, but he maintained to the last his belief in his theories, and to the end he stood forth as the prophet of the school of architecture which had long been called by his name.

Mr. Sullivan's education was received chiefly in the Boston public schools, and his technical and architectural training at the Massachusetts Institute of Technology and the Ecole des Beaux Arts. He came to Chicago in 1880 and began the practice of architecture, first as a member of the firm of Adler & Sullivan and later in independent practice which he continued until his death. The time of his coming to Chicago was during the height of the period in which Chicago, having already recovered from the effects of the Great Fire, was forging ahead to a position among American cities far beyond the wildest dreams of the pioneers who had settled Fort Dearborn, and this expansion created opportunities which architects were not backward in seizing, and Mr. Sullivan was prominent among those whose interest, vision and enthusiasm encouraged the development of the steel-framed building, the use of which is now almost worldwide. Mr. Sullivan received many honors and medals, one being the gold medal of the Union Centrale des Arts Decoratifs.

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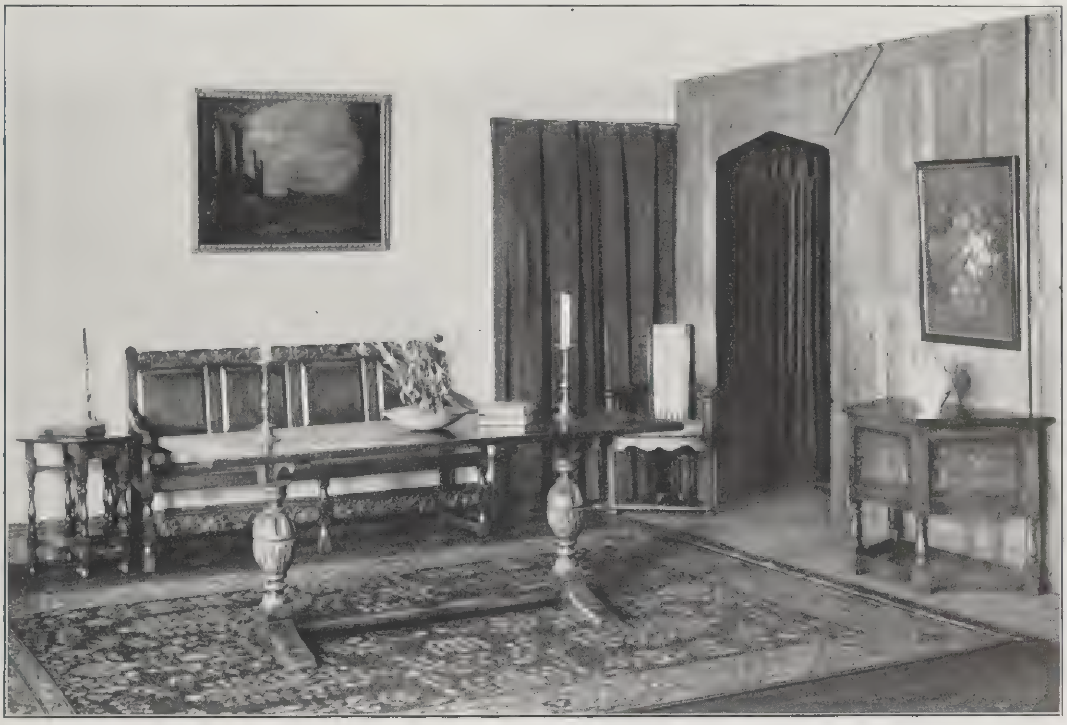
FEBRUARY 1, 1924



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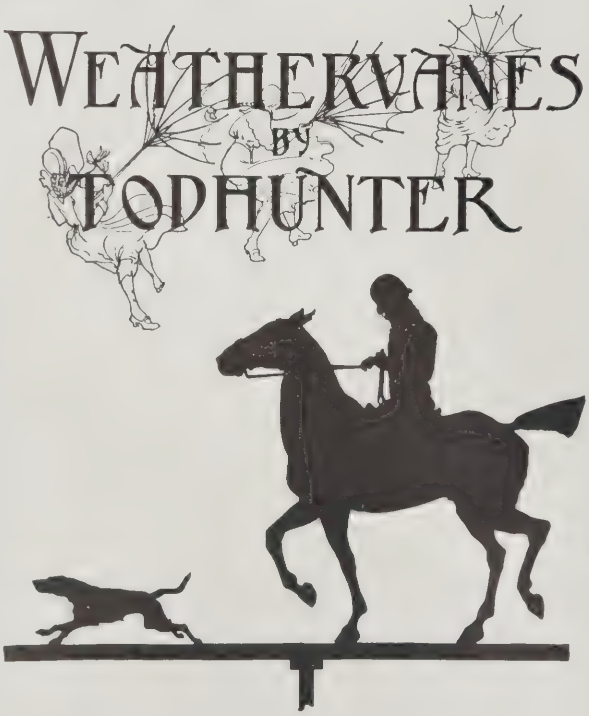

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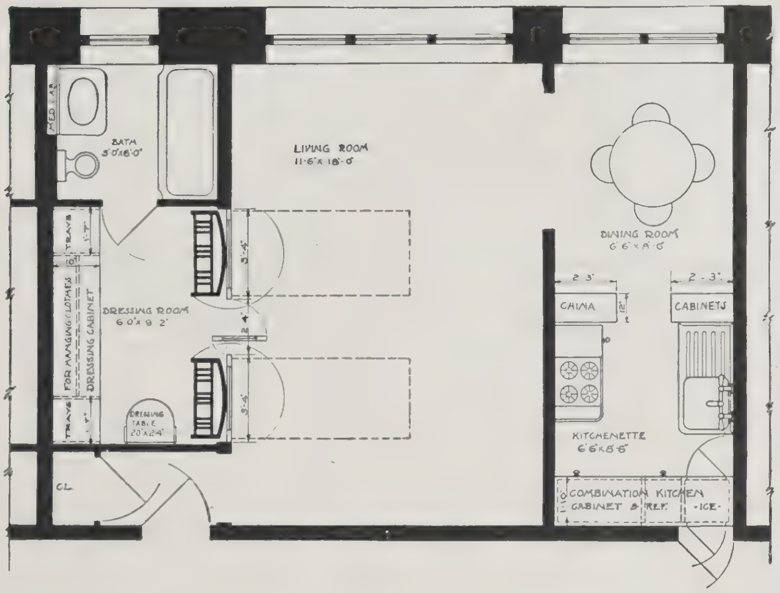

Every architect and builder should have a copy of our Catalog BH97 of "White" Door Beds and Space Saving Devices. This book is especially valuable as it contains floor plans showing the "Efficiency Apartment" as used in various types of installations.

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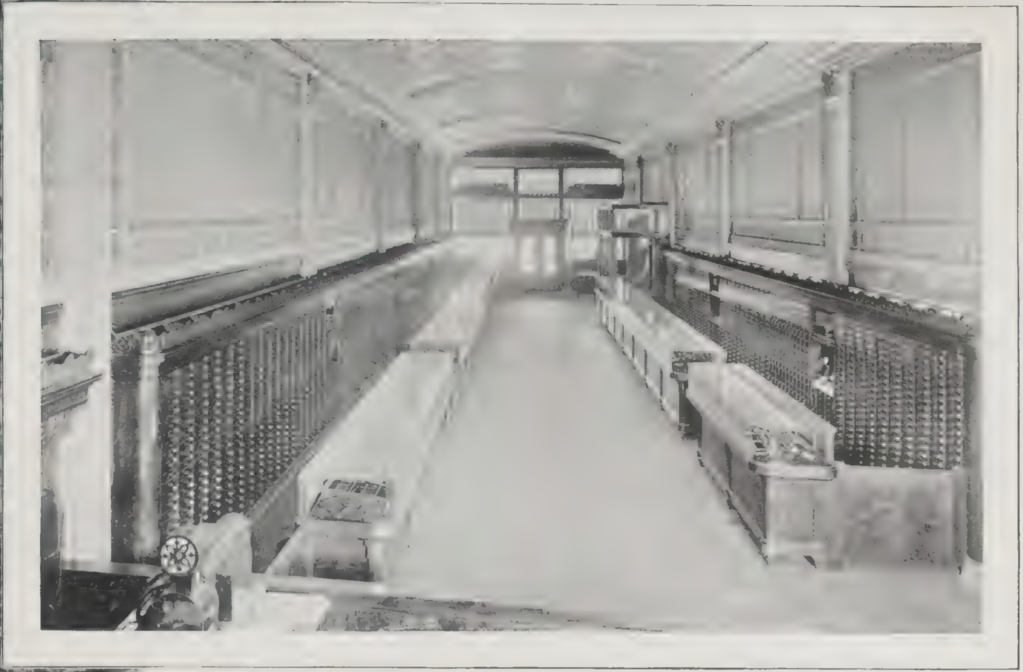

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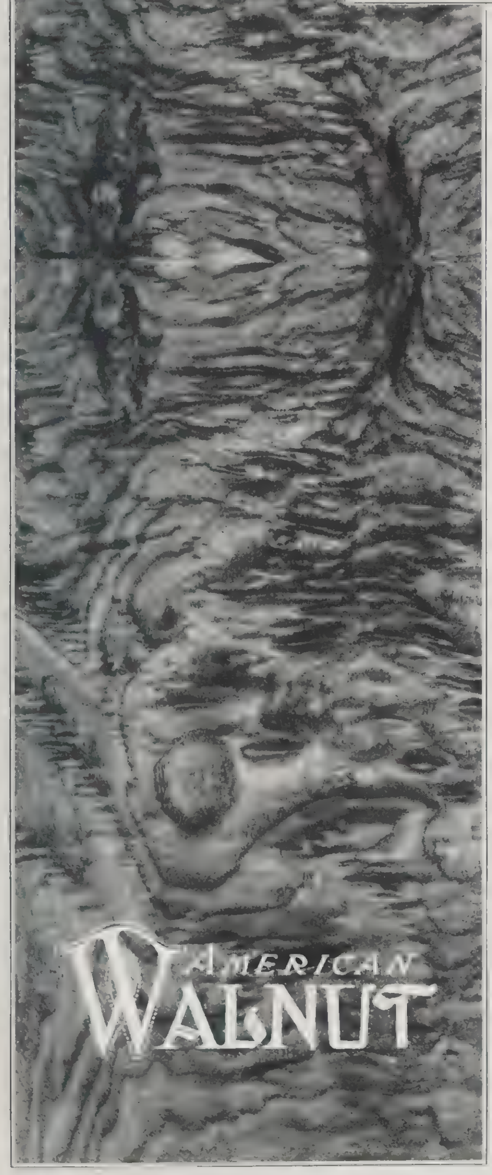
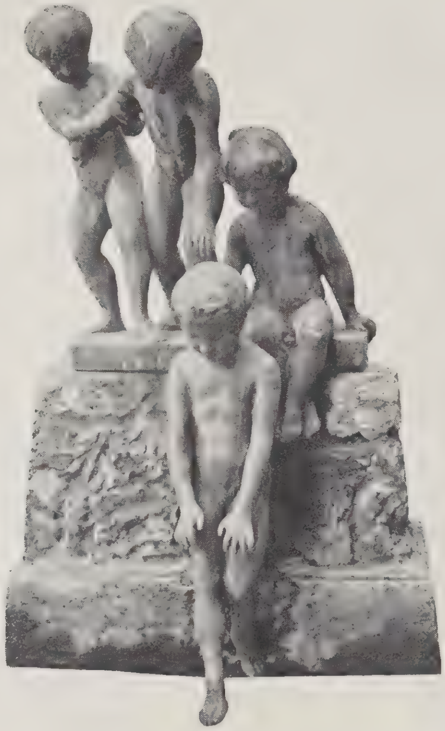
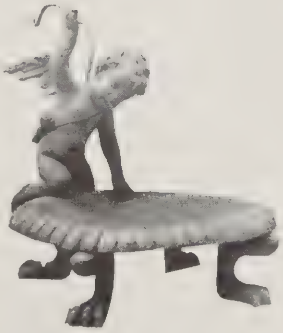


*American Walnut Panel of Matched Stumpwood*

# LOUIS L. ALLEN

*Antiques*





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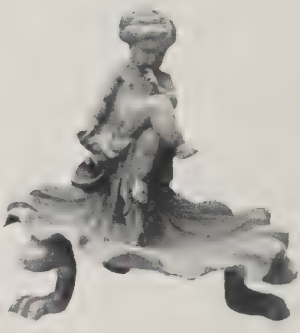

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# SERVICE SECTION
## *of* THE ARCHITECTURAL FORUM

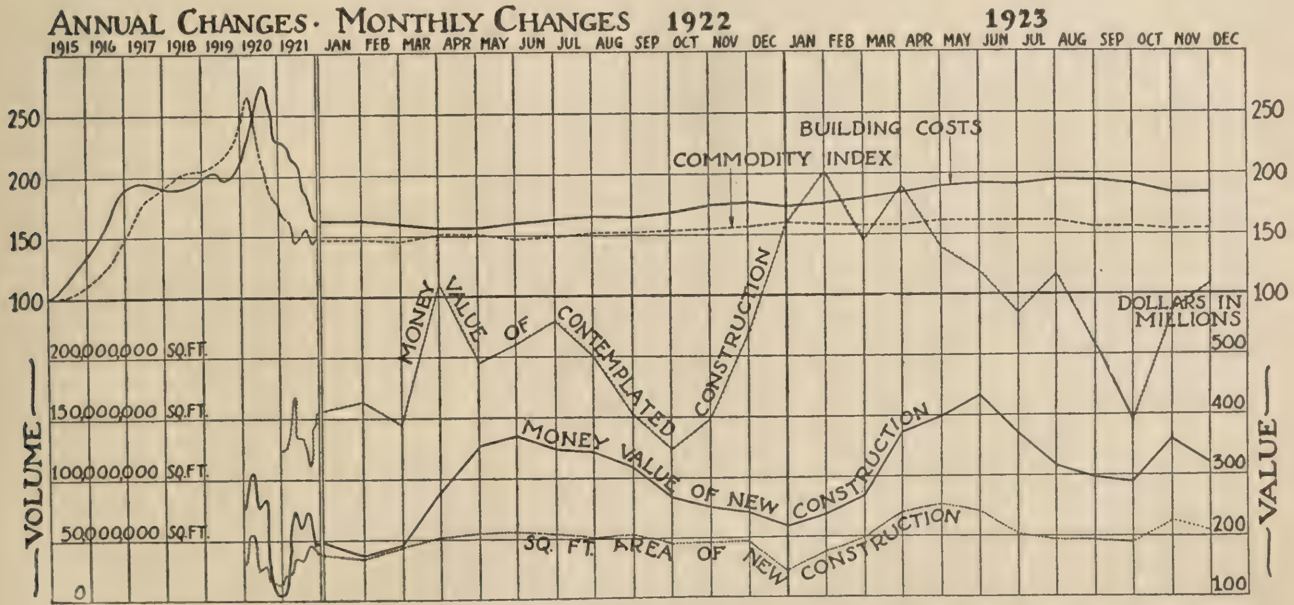
**Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee**

# The Building Situation

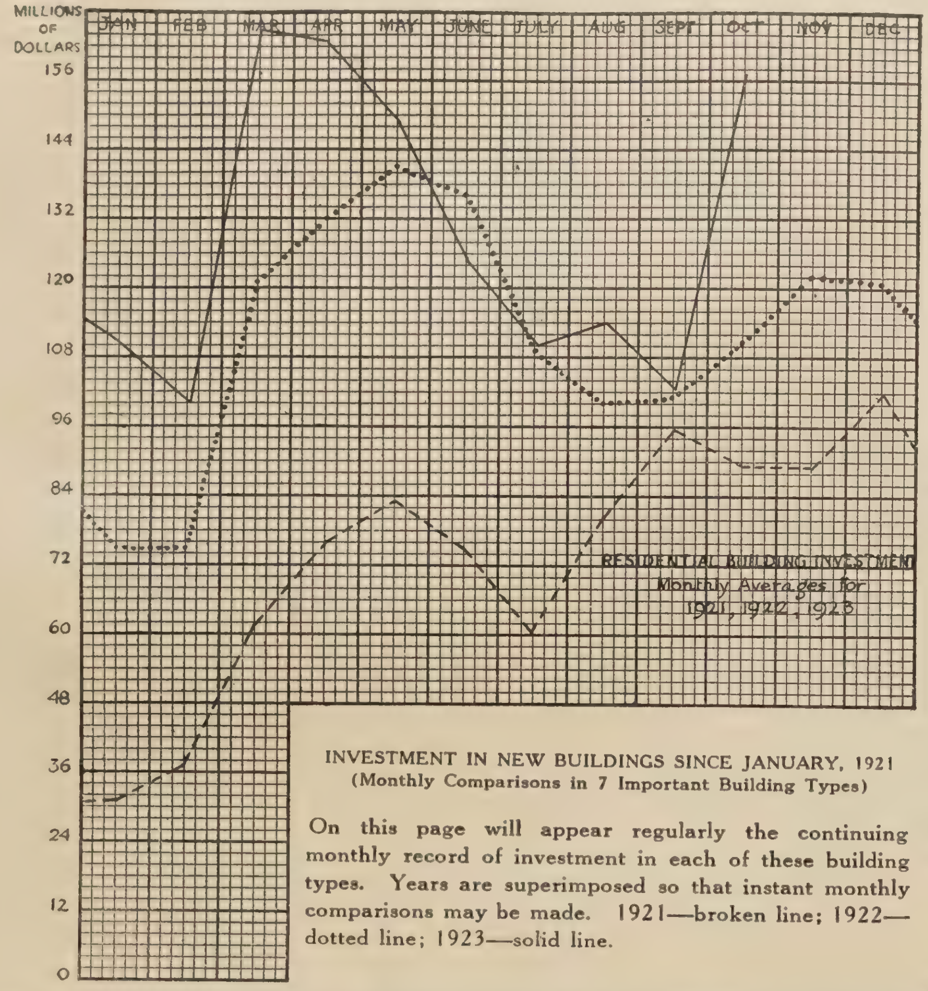
THE year 1923 closed as a record-breaking year in the construction industry, during which $5,000,000,000 was invested in new construction in the United States. The significance of this vast expenditure is that it covered not only the normal construction needs of the year but has contributed approximately $2,000,000,000 toward meeting the building shortage which had been growing since 1913.

One year ago, in its Annual Survey and Forecast, the Research Department of THE ARCHITECTURAL FORUM predicted a $5,000,000,000 year. A similar prediction (as described in detail in the Business and Finance Section of this issue, based on confidential reports from a large number of architects) indicates that the year 1924 will be another $5,000,000,000 building year. The history of construction activity during 1923 records several unusual conditions almost dramatic in their bearing on future activity in this industry. In the early part of the year the letting of a vast number of contracts concentrated the demand for building materials to a point where deliveries became problematical, and a vicious system of over-ordering and duplicating orders developed among contractors and subcontractors. The lesson to be gained from this situation is that, wherever possible, the buying for construction projects should be extended into later months of the year and that serious consideration be given to the feasibility of winter building.

It is quite possible that with a concentration of activity in the spring of 1924 and a resulting upturn in prices and materials, a buyers' strike may become a definite fact and cause considerable slowing up of activity. It is evident that labor rates are to be as high if not higher in 1924, and the only evident stabilizing influence which may help to maintain construction activity within the safety lines of public confidence is the attitude of building material manufacturers and the common sense involved in the distribution of new construction projects more generally throughout the year.



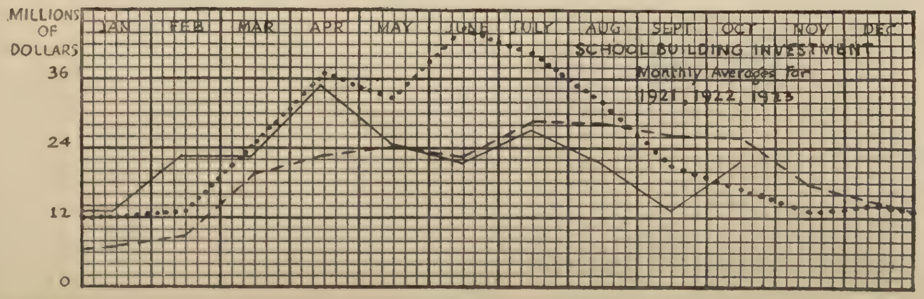
THESE various important factors of change in the building situation are recorded in the chart given here: (1) *Building Costs.* This includes the cost of labor and materials; the index point is a composite of all available reports in basic materials and labor costs under national averages. (2) *Commodity Index.* Index figure determined by the United States Department of Labor. (3) *Money Value of Contemplated Construction.* Value of building for which plans have been filed based on reports of the United States Chamber of Commerce, F. W. Dodge Co., and *Engineering News-Record.* (4) *Money Value of New Construction.* Total valuation of all contracts actually let. The dollar scale is at the right of the chart in millions. (5) *Square Foot Area of New Construction.* The measured volume of new buildings. The square foot measure is at the left of the chart. The variation of distances between the value and volume lines represent a square foot cost which is determined first, by the trend of building costs, and second, by the quality of construction.

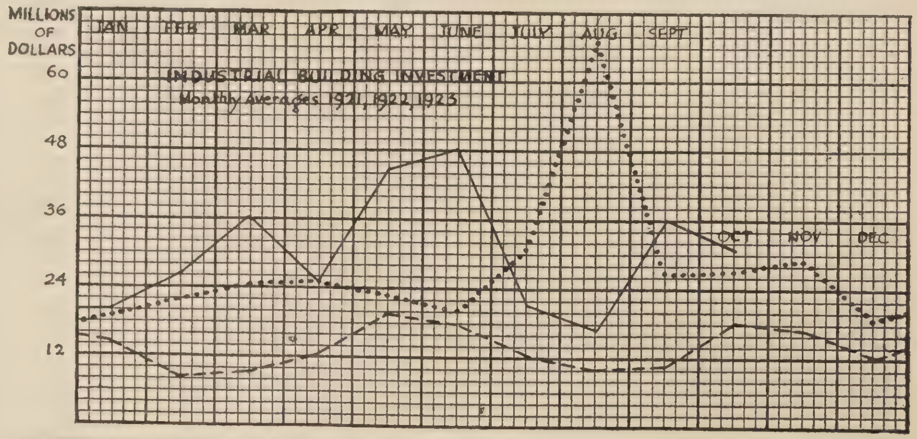


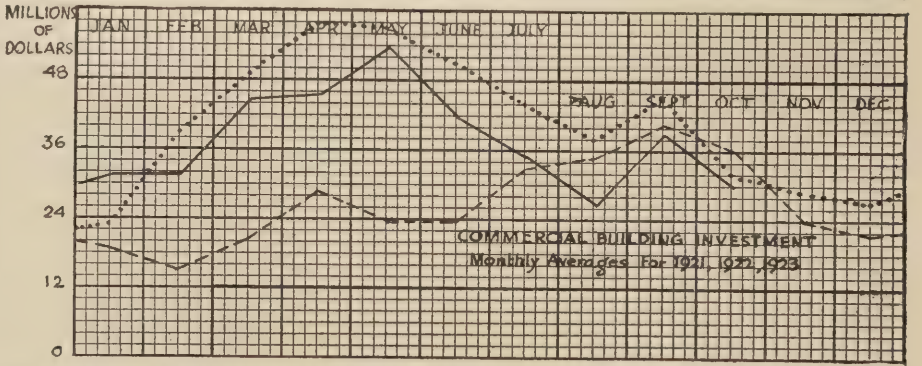
## INVESTMENT IN NEW BUILDINGS SINCE JANUARY, 1921

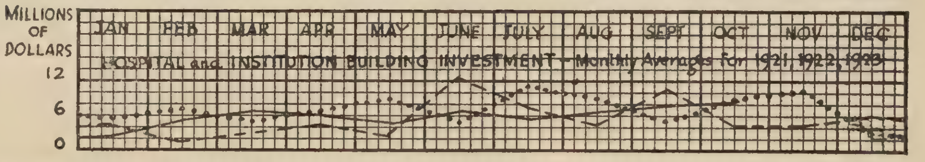
(Monthly Comparisons in 7 Important Building Types)

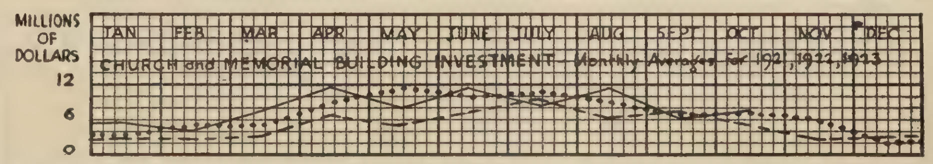
On this page will appear regularly the continuing monthly record of investment in each of these building types. Years are superimposed so that instant monthly comparisons may be made. 1921—broken line; 1922—dotted line; 1923—solid line.

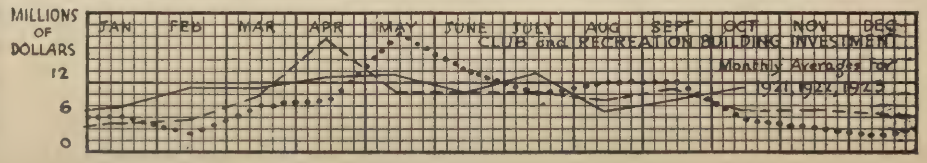












# BUILDING MATERIAL PRICES

Table Showing Average Prices Paid by Contractors for Building Materials at Local Distributing Points as of December 1, 1923. Prepared by Division of Building and Housing of the Bureau of Standards from Prices Secured through the Bureau of Census

| Commodities | Size or Condition | Unit | Mass. Fitch-burg | Haver-hill | Conn. New London | Penn. Pitts-burgh | Erie | Md. Balti-more | Va. Rich-mond | W. Va. Fair-mont | S. C. Co-lumbia | Ga. Savan-nah | Mich. Detroit | Flint | Bay City | Shreve-port | La. New Orleans | N. Dak. Grand Forks | S. Dak. Sioux Falls | N. J. New-ark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Brick |  | 1,000 | 24.00 | 28.00 | 27.00 | 17.00 | 17.75 | 20.00 | 19.00 | 26.00 | 12.00 | 14.00 | 17.50 | 16.00 | 18.00 | 15.00 | 17.75 | 15.00 | 18.00 | 18.00 |
| Portland Cement | Excl. of containers | Bbl. | 3.10 | 3.60 | 3.43 | 2.85 | 3.40 | 2.85 | 3.50 | 2.85 | 3.50 | 3.30 | 3.00 | 2.75 | 2.75 | 3.20 | 3.00 | 3.20 | 3.00 | 3.35 |
| Yellow Pine No. 1 | Dimension 2x4-16′ S1S1E | M | 65.00 | .... | .... | 48.00 | 50.00 | 40.00 | 32.00 | .... | .... | 30.00 | 42.00 | 45.00 | 50.00 | 46.00 | 40.00 | .... | .... | 50.00 |
| Douglas Fir No. 1 | Dimension 2x4-16′ S1S1E | M | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45.00 | 47.00 | .... |
| No. Carolina Pine No. 1 | Dimension 2x4-16′ S1S1E | M | .... | .... | .... | .... | 50.00 | .... | .... | 50.00 | 24.00 | .... | 42.00 | .... | .... | .... | .... | .... | .... | .... |
| Common Boards No. 1 | 1x6 | M | 55.00 | 50.00 | 45.00 | 45.00 | 47.00 | 40.00 | 32.00 | 50.00 | 24.00 | 30.00 | 42.00 | 42.00 | 42.00 | 50.00 | 45.00 | 43.00 | 47.00 | 47.50 |
| Y. P. Flooring Edge Grain "C" | 1x4-10′-16′ | M | .... | 120.00 | 110.00 | .... | .... | .... | .... | 100.00 | 95.00 | .... | .... | 75.00 | 75.00 | 105.00 | 105.00 | .... | .... | 95.00 |
| Douglas Fir V. G. No. 2 | 1x4-10′-16′ | M | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 85.00 | 85.00 | .... |
| Red Cedar Shingles | Extra clear 16″ 5 to 2 | 100 sq. ft. | .... | .... | 6.00 | 6.25 | 6.75 | 11.20 | 7.20 | 7.25 | .... | .... | 5.50 | 6.00 | 7.00 | 5.85 | 6.80 | 4.50 | 5.20 | 6.50 |
| Cypress Shingles | Extra clear 16″ 5 to 2 | 100 sq. ft. | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 6.30 | .... | .... | .... | .... |
| Composition Shingles | Crushed slate surfaced | 100 sq. ft. | .... | .... | .... | 6.00 | 6.25 | 6.00 | 5.48 | 6.25 | 6.50 | 6.50 | 6.00 | 6.25 | 6.00 | 6.90 | .... | 8.00 | 7.50 | 6.50 |
| Gypsum Plaster Board | ⅜″ | 1,000 sq. ft. | .... | 49.00 | 50.00 | 37.50 | 45.00 | 32.50 | 40.00 | 32.00 | 35.00 | 37.50 | 30.00 | 45.00 | 40.00 | 45.00 | 45.00 | .... | 32.00 | .... |
| Lime | Hyd. Com. | Ton | 24.00 | 20.00 | 25.00 | 23.00 | 22.00 | 15.00 | 17.50 | 18.00 | 18.50 | 20.00 | 19.00 | 20.00 | 18.00 | 25.00 | 20.00 | 25.00 | 24.00 | 17.50 |
| Building Sand |  | Cu. yd. | 1.60 | 2.50 | 1.65 | 2.50 | 2.50 | 2.50 | 2.25 | 3.75 | 1.25 | 2.00 | 2.75 | .... | 2.25 | 2.25 | 2.00 | 2.70 | .... | 2.50 |
| Crushed Stone | ¾″ | Ton | 3.25 | 2.50 | .... | 5.50 | 3.50 | .... | .... | 3.00 | 2.75 | 4.40 | 2.35 | .... | 2.50 | 3.20 | 2.60 | .... | .... | .... |
| Wire Nails |  | Keg | 4.10 | 5.00 | 5.05 | 3.50 | 3.50 | 3.75 | 4.05 | 4.00 | 4.25 | 4.00 | 4.25 | 3.75 | 3.85 | 4.60 | 3.80 | 5.50 | .... | 3.80 |
| Window Glass | Single A 10″x12″ | 50 sq. ft. | .... | .... | 4.27 | .... | .... | .... | 5.80 | 5.25 | .... | .... | 4.25 | 4.25 | 5.00 | 5.10 | 4.34 | .... | 6.00 | 4.00 |
| Hollow Tile | 8″x12″x12″ | Each | .... | .30 | .32 | .20 | .21 | .24 | .20 | .26 | .17 | .... | .15 | .... | .17 | .22 | .23 | .... | .19 | .18 |
| Cast Iron Soil Pipe | 4″ E.H. 13 lbs. per ft. | Ton | .... | 78.54 | .... | 55.00 | .... | 52.00 | .... | 88.00 | .... | .... | .... | .... | 83.00 | 106.25 | 58.52 | .... | .... | .... |
| Steel Pipe | 1″ galv. | 100 ft. | .... | .... | .... | 9.86 | .... | 9.88 | 10.00 | 10.00 | 11.87 | 9.46 | 8.50 | .... | 9.50 | 11.95 | 9.53 | .... | .... | 10.40 |
| Reinforcement Bars | ¾″ square | 100 lbs. | 3.50 | .... | .... | 3.50 | .... | 3.55 | 3.35 | 3.50 | 4.50 | 5.00 | 4.00 | .... | 3.70 | 4.00 | 3.75 | .... | .... | .... |
| Structural Steel | Fab. 6″ I-beams | 100 lbs. | 4.50 | .... | .... | 3.25 | .... | 3.75 | 4.50 | 6.00 | 4.75 | 5.00 | .... | .... | 4.70 | 6.50 | 3.90 | .... | .... | .... |
| White Lead | Dry | 100 lbs. | 13.00 | 14.00 | 14.50 | 14.00 | .... | .... | .... | 14.00 | 14.75 | 14.75 | 14.00 | .... | 13.00 | 15.00 | 12.50 | 18.00 | .... | 13.50 |
| Zinc Oxide | Am. process lead free | 100 lbs. | .... | .... | .... | 15.00 | .... | .... | 15.00 | .... | 20.00 | 20.00 | .... | .... | .... | .... | 15.00 | .... | .... | .... |
| Gypsum plaster | Neat | Ton | 25.00 | .... | 26.00 | 22.00 | 24.00 | 19.50 | 19.50 | 19.00 | 19.00 | 20.00 | 18.00 | 17.00 | 17.00 | 24.00 | 21.00 | 27.00 | 14.50 | 19.00 |
| Linseed Oil | Raw in bbls. | Gal. | .... | 1.03 | 1.35 | .92 | .... | .95 | 1.12 | 1.30 | 1.05 | 1.00 | 1.18 | .... | 1.15 | 1.55 | 1.00 | 1.50 | .... | 1.00 |
| Roofing Slate | No. 1 ribbon | 100 sq. ft. | .... | .... | .... | 13.50 | .... | .... | 13.50 | 12.50 | .... | .... | .... | .... | 17.00 | 12.00 | 16.00 | .... | .... | 13.50 |
| Tar Paper, Roofing | 2-ply 75 lbs. per roll of | 100 sq. ft. | .... | 2.75 | .... | 1.95 | .... | .... | .... | .... | .... | .... | 2.75 | 2.75 | 2.75 | 2.75 | .... | .... | 3.75 | 2.25 |
| Rosin Sized Sheathing | 3-ply 30 lbs. per roll of | 500 sq. ft. | .... | 1.70 | .... | 1.35 | 1.40 | 1.75 | 1.50 | 1.25 | .... | 1.00 | 1.40 | 1.50 | 1.10 | 1.40 | .... | .... | 1.50 | 1.20 |

| Commodities | Size or Condition | Unit | New York Pough-keepsie | Schenec-tady | Roches-ter | Buffalo | Ohio Cleve-land | Akron | Lorain | Dayton | Iowa Water-loo | Des Moines | Council Bluffs | Spo-kane | Wash. Seattle | Ore. Port-land | Wis. Mil-waukee | Ariz. Tucson | Cal. Los Angeles | Mo. Kansas City |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Brick |  | 1,000 | 20.00 | 22.50 | 17.75 | 23.00 | 16.00 | 16.00 | 20.00 | 18.00 | 16.50 | 19.00 | 16.50 | .... | 15.00 | 20.00 | 13.50 | 12.50 | 15.50 | 16.50 |
| Portland Cement | Excl. of containers | Bbl. | 3.30 | 3.60 | 3.35 | 3.03 | 3.40 | 3.50 | 3.50 | 3.60 | 2.90 | 3.40 | 2.90 | .... | 3.20 | 3.35 | 2.66 | 3.80 | 3.36 | 2.70 |
| Yellow Pine No. 1 | Dimension 2x4-16′ S1S1E | M | .... | 53.00 | 48.00 | 55.00 | 56.00 | 45.00 | 55.00 | 57.50 | 50.00 | 52.00 | 50.00 | .... | .... | .... | 42.00 | .... | .... | 44.00 |
| Douglas Fir No. 1 | Dimension 2x4-16′ S1S1E | M | 49.50 | .... | 56.00 | 60.00 | .... | .... | .... | .... | 50.00 | 52.00 | 48.00 | 30.00 | 21.50 | 24.50 | .... | 62.00 | 41.50 | 44.00 |
| No. Carolina Pine No. 1 | Dimension 2x4-16′ S1S1E | M | 49.50 | .... | 48.00 | .... | .... | .... | .... | 52.50 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Common Boards No. 1 | 1x6 | M | 38.00 | 60.00 | 45.00 | 50.00 | 48.00 | 45.00 | 50.00 | .... | 45.00 | 56.00 | 48.00 | .... | 21.50 | 24.50 | .... | 57.50 | 40.00 | 50.00 |
| Y. P. Flooring Edge Grain "C" | 1x4-10′-16′ | M | 130.00 | 140.00 | 130.00 | .... | 90.00 | .... | 110.00 | .... | 95.00 | 106.00 | 112.00 | .... | .... | .... | 85.00 | .... | .... | 105.00 |
| Douglas Fir V. G. No. 2 | 1x4-10′-16′ | M | .... | .... | .... | 115.00 | .... | .... | .... | 90.00 | 95.00 | 95.00 | 100.00 | .... | 56.00 | 58.00 | .... | 95.00 | 82.75 | 85.00 |
| Red Cedar Shingles | Extra clear 16″ 5 to 2 | 100 sq. ft. | .... | 6.80 | 6.00 | 6.75 | 6.00 | 5.75 | 6.00 | 6.20 | 6.50 | 6.50 | 6.25 | .... | 3.50 | .... | 5.75 | .... | 4.06 | 6.00 |
| Cypress Shingles | Extra clear 16″ 5 to 2 | 100 sq. ft. | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Composition Shingles | Crushed slate surfaced | 100 sq. ft. | .... | 6.25 | .... | .... | .... | .... | 6.50 | 6.50 | 7.50 | 6.00 | .... | .... | .... | .... | 6.50 | .... | .... | .... |
| Gypsum Plaster Board | ⅜″ | 1,000 sq. ft. | 47.50 | 43.75 | 30.00 | 45.00 | 32.00 | 27.60 | .... | .... | 36.00 | 40.00 | 35.00 | .... | 35.00 | 40.00 | 42.00 | 50.00 | 40.00 | 32.50 |
| Lime | Hyd. Com. | Ton | 22.00 | 20.00 | 20.00 | 16.00 | 18.00 | 20.00 | 17.00 | 15.20 | 20.00 | 20.00 | 21.00 | .... | 22.00 | 26.00 | .... | .... | 26.50 | .... |
| Building Sand |  | Cu. yd. | 2.50 | 2.25 | 2.25 | 1.28 | 2.50 | 1.90 | 3.00 | 2.00 | 1.50 | 2.00 | 3.50 | .... | 1.75 | 2.60 | 2.25 | 1.25 | 1.75 | 1.80 |
| Crushed Stone | ¾″ | Ton | 2.60 | 3.25 | 2.25 | 1.30 | 3.50 | 3.25 | 2.65 | 2.00 | 3.00 | 4.30 | 4.00 | .... | .... | .... | 2.67 | 3.00 | 3.10 | 2.10 |
| Wire Nails |  | Keg | 5.08 | 4.20 | 4.25 | 4.25 | 3.90 | 3.80 | 3.75 | 3.90 | 4.50 | 4.25 | .... | 4.85 | 4.35 | 4.50 | 3.80 | 6.00 | 4.50 | 4.20 |
| Window Glass | Single A 10″x12″ | 50 sq. ft. | .... | .... | 4.20 | 4.20 | .... | 4.50 | .... | 4.50 | 5.25 | 4.75 | .... | .... | 4.00 | 5.00 | 4.75 | .... | 4.38 | 4.50 |
| Hollow Tile | 8″x12″x12″ | Each | .22 | .33 | .21 | .20 | .... | .17 | .18 | .21 | .17 | .... | .... | .... | .20 | .20 | .17 | .18 | .20 | .22 |
| Cast Iron Soil Pipe | 4″ E.H. 13 lbs. per ft. | Ton | .... | .... | 73.15 | 63.05 | .... | 71.82 | .... | .... | 82.00 | 90.00 | .... | 88.00 | 91.40 | 113.00 | 97.00 | .... | 75.19 | .... |
| Steel Pipe | 1″ galv. | 100 ft. | .... | .... | 10.52 | 10.00 | .... | 10.36 | .... | 10.57 | 12.00 | 11.50 | .... | 11.50 | 12.78 | .... | 12.50 | 14.50 | 12.35 | 11.20 |
| Reinforcement Bars | ¾″ square | 100 lbs. | 4.50 | 4.00 | 3.60 | 2.75 | .... | 3.90 | 3.95 | .... | 4.00 | 3.25 | 3.25 | 4.40 | 3.50 | 4.00 | 3.25 | 4.50 | 4.25 | .... |
| Structural Steel | Fab. 6″ I-beams | 100 lbs. | 5.00 | .... | 4.50 | 3.65 | .... | 3.50 | 4.25 | 3.25 | 4.95 | 5.00 | .... | .... | 6.00 | 5.50 | 5.75 | .... | 6.00 | 3.80 |
| White Lead | Dry | 100 lbs. | .... | 14.50 | 12.60 | 14.00 | 14.00 | 14.00 | 13.00 | 14.50 | 14.50 | 14.50 | 15.50 | .... | 13.25 | .... | .... | 15.50 | 13.00 | 14.13 |
| Zinc Oxide | Am. process lead free | 100 lbs. | .... | .... | .... | .... | .... | .... | .... | 15.00 | .... | 14.75 | .... | .... | .... | .... | .... | .... | 12.75 | 10.00 |
| Gypsum plaster | Neat | Ton | 21.00 | .... | 18.00 | 17.00 | .... | 19.00 | 17.20 | 18.00 | 18.00 | 18.00 | 17.00 | 20.00 | 21.00 | 24.00 | .... | 23.00 | 17.80 | 18.00 |
| Linseed Oil | Raw in bbls. | Gal. | .... | .... | 1.05 | 1.23 | 1.00 | .96 | .... | 1.20 | 1.30 | 1.20 | .... | 1.04 | 1.07 | 1.25 | 1.07 | 1.12 | 1.10 | 1.19 |
| Roofing Slate | No. 1 ribbon | 100 sq. ft. | .... | .... | 15.00 | .... | .... | 13.50 | .... | 15.00 | 18.00 | 18.00 | .... | .... | .... | .... | .... | .... | .... | .... |
| Tar Paper, Roofing | 2-ply 75 lbs. per roll of | 100 sq. ft. | .... | .... | 2.25 | 2.00 | 2.50 | 2.75 | .... | .... | 3.25 | 3.00 | .... | 2.82 | .... | .... | .... | 3.50 | 3.75 | .... |
| Rosin Sized Sheathing | 3-ply 30 lbs. per roll of | 500 sq. ft. | .... | 1.50 | 1.25 | 1.50 | .90 | .85 | .... | .... | 1.50 | 1.40 | 1.40 | 1.28 | 1.20 | 1.80 | .... | 1.75 | 1.50 | 1.05 |

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(*b*) That no committee member has affiliations with any manufacturer;
(*c*) That no committee member will be called upon for detailed service excepting by special arrangement;
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# THE FORUM DIGEST

## A SURVEY OF IMPORTANT CURRENT ARTICLES ON BUILDING ECONOMICS AND BUSINESS CONDITIONS AFFECTING CONSTRUCTION

**The Editors of this Department select from a wide range of publications matter of definite interest to Architects which would otherwise be available only through laborious effort**

### 1924 OUTLOOK FOR BUILDING

A RECENT issue of the *Engineering News-Record* contains an encouraging forecast for building during this year:

"Although reports of increasing unemployment in certain industries have been coming in of late, the construction industry is in a healthy state of activity owing to favorable weather and certain price concessions. *Engineering News-Record's* correspondents in various centers look with confidence toward 1924 and support their optimism with figures. On the other hand, it will not be denied that construction cost is very high. If it goes much higher, the effect upon 1924 construction will be serious.

"Building prospects and labor rates and conditions in the larger cities are as follows:

"Atlanta—Majority of sub-contractors have enough business booked to carry them through the first six months of 1924. Labor situation satisfactory; plenty of help, with exception of plasterers and tilesetters. Plasterers getting as high as $1.50 per hour. Prospects never better than for 1924 building season.

"Baltimore—Architects and engineers are now preparing plans for about $20,000,000 worth of new industrial and commercial buildings, and the city plans to complete this year about $30,000,000 worth of schools, piers, etc. Altogether, authorities in building circles say that $70,000,000 will be spent in 1924 for new work. A $2,500,000 plant for the Standard Sanitary Manufacturing Co. of Pittsburgh has been started and will be completed this year. It will be the largest plant of its kind in the East. Harmony reigns between employer and employe and will no doubt continue throughout 1924. There has been a shortage of skilled mechanics, particularly plasterers, which held up school construction. The present wage scale will probably prevail throughout 1924.

"Birmingham—There are no strikes or other evidences of labor trouble in sight, and while 1923 has been a banner year in building construction, the work has been confined very largely to residences, apartments and stores. In spite of this the housing situation is still acute, and the need of more office buildings and large stores is made apparent by excessive rents. Over $10,000,000 worth of new construction is now projected for the near future, and it would appear from the standpoint of the building trades and materials men that the year 1924 will be exceedingly prosperous.

"Boston—Work rather slack owing to usual cold weather let-down. This condition will continue for the next two months. Most of the big jobs started in 1922 practically completed, but much new work consisting of municipal, state and private projects now under way for spring opening. The outlook, however, is not quite up to 1922 standards, although no serious labor trouble or immediate wage increases or reductions are anticipated. Materials are easier to get than for several years. In general the outlook points to a sound year for labor, contractors and owners.

"Chicago—The outlook for 1924 in Chicago points to a volume of construction at least equaling last year's. Nearly all building trades mechanics have signified their intentions of asking for a wage increase of 25c per hour starting June 1. Shortage of mechanics has given rise to payment of present premium wage schedule.

"Cleveland—There is little likelihood of any strikes or disputes over wages developing in Cleveland during 1924. Building crafts and employers have adopted the custom of getting together before May 1 of each year to settle all differences before the building season becomes too far advanced. This year the effort has been successful, and preliminary meetings have already been held. Indications are that present rates will hold for 1924. There is no surplus of building labor in Cleveland, with the shortage more marked in bricklayers and plasterers than in any other lines.

"Denver—Employment in the building trades in Denver at the close of 1923 was about 75 per cent of normal on the average. The past year has been free from strikes of importance, and the wage scales now in effect were adopted over the conference table in the spring of 1923. No changes are contemplated, and the 1924 outlook is especially good. Labor leaders estimate that 90 per cent will be employed in the spring, the remaining 10 per cent representing the floating idle labor generally found in the market.

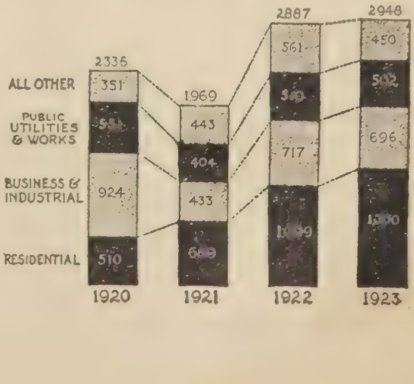
"Kansas City—A number of very large projects such as apartment, office and factory buildings, a new inter-urban station, a new Board of Trade building, and a pumping station costing over $22,000,000 are now under way. There is plenty of help in all grades, but labor and employers' organizations are not working in harmony with each other. The cement finishers, for instance, who were recently granted an increase, are now demanding $1.25 per hour, effective March 1, otherwise a strike will be forthcoming. Plasterers, now getting $11 per day, are asking $14, with no Saturday, Sunday or holiday work. A strike seems imminent in this trade if the increase is not granted.

"Los Angeles—There is much new construction already in sight for 1924. The year just past has been the best in Los Angeles' building history.

"Minneapolis—No clouds in the labor sky. There will be some working below scale this winter in the skilled trades, owing to seasonal increase in unemployment. No definite action toward fixing a 1924 wage scale will be taken before April. Labor may at that time resent any attempt at reduction."

### FOUR YEARS OF BUILDING ACTIVITY

THIS diagram, from the *Monthly Review* of the New York Federal Reserve Bank, comparing the figures for the first ten months of the years from 1920 to 1923, indicates the importance of residential construction in increased building activity, as business and industrial building has declined since 1920 and other groups have shown small changes. Because of the decline in construction costs from the high point of 1920, the increase in the actual volume of building has been larger than is indicated by the dollar figures.



## NEW YORK SETTLES BUILDING LABOR SITUATION

THE New York *Times* reports a recent meeting of the old Building Trades Council which ratified the agreements made between seven unions and their employers, involving approximately 40,000 workmen. The action practically assures a stabilized condition in the building trades for two years.

Both employers and employes expressed confidence that another week would see the ratification of agreements between the remaining 29 unions and the employers' associations, and that by the end of the first week in January the 100,000 journeymen and helpers in the building trades will be at work under one- or two-year agreements, mainly under the longer term contracts.

The seven unions whose tentative contracts were made permanent recently are the Carpenters' District Council, the Hoisting Engineers, Machinists' District Lodge 15, Sheet Metal Workers' Local 28, Tile Layers' Union 52 and the Art Glass Workers and the Plate and Sheet Glass Glaziers.

The carpenters, sheet metal workers and tile layers have received an advance of 50 cents a day and will get $10.50 a day from January 1. Their contract runs for two years. The engineers are at work on a one-year contract at the rate of $12 a day. The art glass workers receive $9, and the glaziers $10.

Originally the unions in the Building Trades Council demanded an increase in the basic wage of $1 a day. The men were getting $9 a day with a bonus of $1, and the object of the demand was to increase the wage to $11 a day, to last for two years. The employers opposed the move, but offered to write the existing wage and bonus into an agreement as a regular wage of $10. They felt that to meet the demand would be ruinous to the industry and would exact $25,000,000 a year from the builders. The compromise of 50 cents a day will give the workmen about $12,000,000 more a year.

It was pointed out that peace in the building trades for two years will give architects and builders an opportunity to draw up plans and figure more or less accurately on wages for at least a year and a half in advance. Builders feel that the next year or two will see records in the building industry, and are of the opinion that work will be available for all who desire employment.

## E. N.-R. CONSTRUCTION COST INDEX

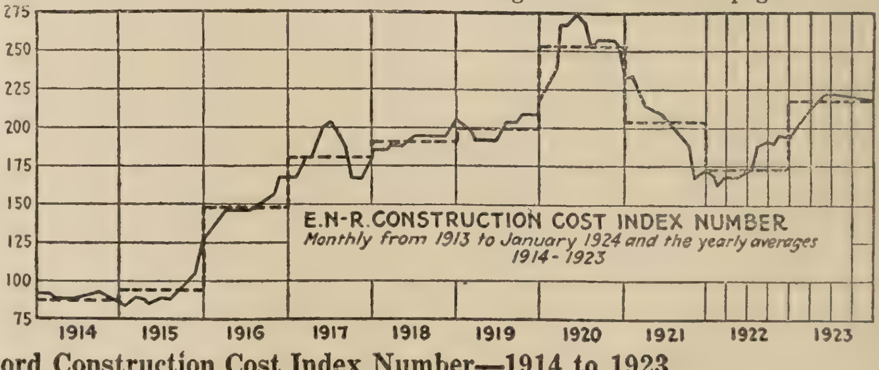
"*ENGINEERING NEWS-RECORD'S* Construction Cost Index Number," says a late issue, "is a national index of general construction cost in the United States. For that reason in its computation only the great basic materials and common labor are considered. Steel, cement and lumber are the fundamental materials of the construction industry, and the rate paid common labor eventually determines the cost of labor. The importance of the cost of brick, sand, gravel, crushed stone and the rest is not minimized; but these materials are usually produced locally, and their prices are subject to fluctuating local conditions.

"*The Engineering News-Record* Construction Cost Index Number is not referred to Boston or Seattle, to Minneapolis or El Paso, but to the 3,507,640 square miles of the United States. Change in towing rates on the Hudson River will affect the price of brick or crushed stone, alongside dock, New York, without making any change whatever in the nation-wide cost of construction. On the other hand, a price movement in either steel, cement or lumber wields an influence that is almost invariably continental in scope.

"The *Engineering News-Record* Construction Cost Index Number is based on the prices of steel, cement, lumber and common labor in 1913. Furthermore, these materials and common labor are weighted according to their relative importance as adjudged by *Engineering News-Record.* These weightings are: Steel, 37.50 per cent; cement, 7.14 per cent; lumber, 17.10 per cent; labor, 38 per cent. The weightings were determined by studying the annual production of the three prime materials and the number of common laborers (exclusive of farm labor) in the United States. The markets considered are structural steel in Pittsburgh, cement without bags f. o. b. Chicago; 3 x 12-in. to 12 x 12-in. Southern pine to contractors in New York, and the average price of common labor in the 18 to 20 cities listed in the *Engineering News-Record* in the first issue of each month. The prices are those obtaining in the last week of each month and published in the first issue of each month. The quantities of these materials and the number of man-hours used in computing the Index Number were selected so that the total cost (quantities multiplied by prices, and added together) for 1913 would be $100 for a 'unit of construction.'

"For example, if the quantities are 2,500 lbs. of structural steel, six barrels of cement, 600 ft. b.m. of lumber, and 200 man-hours, and the prices are $1.50 per 100 lbs. for shapes, $1.19 per net bbl. of cement, $28.50 per M ft. b.m. of lumber, and 19 cents per hour for common labor, the total computation will be $99.74; 100 is the base *Engineering News-Record* Construction Cost Index Number.

"The accompanying tabulation gives the *Engineering News-Record* Construction Cost Index Number for every month from 1913 to December, 1923, while the chart gives both the monthly and yearly numbers. The current index number is presented in its regular form on this page."



### Engineering News-Record Construction Cost Index Number—1914 to 1923

| | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 |
|---|---|---|---|---|---|---|---|---|---|---|
| January | 89.22 | 87.12 | 130.46 | 167.75 | 184.51 | 198.05 | 206.55 | 230.87 | 168.72 | 191.70 |
| February | 89.22 | 87.36 | 134.46 | 167.75 | 184.51 | 201.50 | 225.10 | 230.67 | 168.72 | 197.40 |
| March | 88.97 | 87.66 | 142.96 | 175.66 | 184.51 | 198.05 | 240.85 | 224.27 | 162.04 | 205.25 |
| April | 87.97 | 90.16 | 147.31 | 183.41 | 186.01 | 191.25 | 265.20 | 213.07 | 164.72 | 213.50 |
| May | 88.62 | 90.16 | 148.86 | 187.61 | 186.01 | 191.25 | 268.90 | 210.82 | 164.62 | 216.70 |
| June | 87.87 | 88.96 | 146.51 | 199.26 | 186.31 | 191.85 | 273.80 | 209.82 | 166.62 | 220.70 |
| July | 88.12 | 90.51 | 145.76 | 204.01 | 188.65 | 193.65 | 265.65 | 203.82 | 169.70 | 222.10 |
| August | 90.11 | 91.76 | 146.56 | 198.41 | 193.85 | 196.65 | 252.00 | 103.07 | 173.40 | 221.50 |
| September | 90.36 | 93.01 | 149.56 | 190.31 | 193.85 | 202.85 | 255.20 | 188.27 | 185.00 | 221.50 |
| October | 88.51 | 96.16 | 152.91 | 167.11 | 193.85 | 202.25 | 255.20 | 182.57 | 188.60 | 220.30 |
| November | 87.26 | 101.06 | 155.66 | 166.51 | 193.55 | 206.85 | 255.32 | 166.32 | 188.60 | 220.90 |
| December | 86.51 | 107.06 | 167 15 | 167 11 | 194.75 | 206.85 | 251.62 | 167.82 | 192.60 | 217.30 |
| Averages | 88.56 | 92.58 | 147.35 | 181.24 | 189.20 | 198.42 | 251.28 | 201.78 | 174.45 | 214.07 |

## LABOR SHORTAGE AND WINTER BUILDING

THE shortage of labor in the building trades during the busy season seems to become more pronounced each year. "Each spring and summer," says *Building Topics*, published monthly by Monks & Johnson, "see contractors offering inducements in the form either of premium wages or assurance of overtime at the regulation rate in order to secure workmen. There is little or no opportunity to select artisans for the quality of their workmanship. All are employed and all are eagerly sought by employers. Inefficiency abounds and costs mount high.

"In the winter, however, there is unemployment. A chart recently published by the Boston Building Congress gives the percentage of employment during the months of December, January and February thus:

| | |
|---|---|
| Common Labor | 40% |
| Carpenters | 50% |
| Masons | 25% |
| Lathers | 40% |
| Plasterers | 50% |
| Painters | 25% |

"While recognizing, as elements contributing to labor shortage, the trend of the times, which leads young men to prefer the so-called 'white collar' job at small salary, and the alleged restrictive regulations and practices of labor unions relative to apprenticeship, this violent seasonal fluctuation in employment is probably the greatest deterrent to recruiting in the building trades. The fluctuation is discouraging to the artisan and costly to the builder. It not only accounts for acute shortage of labor in the busy season, but it effectually conceals from view the fact of an average shortage throughout the year, if, indeed, such shortage exists.

"Workingmen's expenses of living run through the whole year and it is the annual earnings that are of vital concern in meeting these expenses. If employment is lumpy, with periods of idleness, the wage rate must be correspondingly high. Labor leaders recognize this in their efforts to control wages and, as we have pointed out, it is an important factor in the natural determination of wages through competition of new men coming into the various trades. If the fluctuations and periods of idleness could be eliminated, or materially lessened, wage rates would naturally seek a lower level, which labor unions would be powerless to prevent inasmuch as the annual earnings would be equal to or greater than those at present. Other things equal, building costs would be materially lowered. But elimination of seasonal fluctuation means building in winter. Is it possible? Is it economical?

"Experience has shown that winter building *is* possible, and in most kinds of construction without sacrifice of quality. There remain, therefore, only considerations of economy. It would cost more to build in winter, were other factors the same, than in the warmer months. Materials must be heated and protection provided to prevent fresh concrete and mortar from freezing. Numbed fingers are not nimble. Snow must be removed. There is a well recognized additional expense involved in these factors. But there are factors on the other side.

"In the winter there is ample supply of labor. Wage premiums and overtime assurances are unnecessary. Selection of artisans is possible, and competition spurs them to greater efforts. The market for building materials almost invariably eases up in the late fall and winter. Shrewd purchasers can buy for mid-winter delivery substantially below spring and summer prices. Contractors anxious to keep their organizations functioning and thus meet the cost of that bugaboo of business executives, overhead, are often glad to forego in the winter months further profit. These factors all favor winter building and may balance or outweigh the cost of heating and protection.

"But, someone will object, these factors depend for their very existence on the seasonal fluctuation. Were building operations to become uniform, they would disappear and there would be nothing to offset the very real costs of heating and protection. That is true. The economies of winter building can never completely eliminate the seasonal fluctuation in the building trades, for with it they would eliminate themselves. Construction operations seek a balance where the economies of winter building average to meet its added cost.

"It is our opinion, based on observation and on consultations with a number of competent builders, that the present status rests on long past experience and that recent progress in the art of construction, particularly in concrete work, renders the present fluctuation unnecessarily violent. We believe that a larger volume of winter building may economically be undertaken."

## ECONOMIC PROSPECTS FOR 1924

SINCE prosperity in one department of business is dependent to a great extent upon equal prosperity in other lines, it is useful for those interested in building to survey the outlook for other forms of business during the new year. Of particular interest, therefore, is a statement upon the subject by Herbert Hoover, issued by the Department of Commerce:

"The economic outlook for our own country for the next year is bright. In general the world situation is hopeful. The general spirit of prudence, the absence of speculation, complete employment, high production, and the great financial strength and stability of the important states in the western hemisphere, together with the promise of the early conference for systematic consideration of constructive solution of the world's greatest economic menace—Franco-German relations—all create a hopeful foundation on which the new year may build.

"In 1923 the United States witnessed the highest total productivity and movement of commodities since the war, with full employment, high real wages, greatly increased savings, large additions to home building, and the largest increase in railway equipment since the war. The whole has been accompanied by a remarkable absence of speculation, consequent over-accumulation of consumable goods, or dangerous expansion of credit. As we are not in a boom we can expect freedom from a slump. Some secondary interrogations can be raised as to the effect of the expansion of installment buying of consumable goods, the acute suffering in the Northwestern agricultural areas, the increase on stocks of some commodities, and decrease on some advance orders. These items are small compared to the whole industrial fabric. Taking the country as a whole, we never in history have enjoyed a higher standard of living and comfort, nor so great a degree of commercial and industrial efficiency as today or so wide an understanding of the forces which control the ebb and flow of business. As severe as the situation is in the worst of the agricultural states, the disparity between agricultural prices as a whole and industrial commodities is gradually lessening, and the economic balance is tending to right itself.

"In construction work the large additions to our railway equipment have enabled the railways to fully handle the traffic for the first time since the war, and this marks a great achievement. In building there has been about the same floor space constructed, but there has been a great shift from public construction to make way for private work, as indicated by the decline of over 20 per cent in public building construction and an increase of about 15 per cent in residential building compared to 1922. This shift from public to private construction is also indicated by the fact that concrete road contracts declined about 16 per cent, while the output of cement, however, increased.

"The national debt has been reduced about one billion dollars during the year; bank debits to individual accounts remained about the same in New York, but increased about 12 per cent in the rest of the country. The money in circulation apparently increased about 6 per cent. Member banks show an increase of about 6 per cent in loans and discounts. The reserve ratio is about the same as a year ago, that is about 76 per cent. Savings increased about 10 per cent and life insurance sales about 22 per cent. The financial items, therefore, show a general parallel with increased production without inflation.

"Our own country has exhibited extraordinary strength and progress. The basis of healthy business activity lies in balanced budgets, stable currency, high production accompanied by proportionate consumption and savings with an absence of speculation, extravagance, and inflation. These things we have in the United States. The odds are favorable to 1924."

Conditions in the building world are naturally affected by the prosperity of the steel industry, and this industry is in turn affected by building conditions. It is interesting, therefore, to learn from an interview with the president of a great steel corporation, as reported in the New York *Tribune*, that:

"Sentiment in the steel industry is better than it was a year ago. Fundamental conditions underlying the industry are on a sound and substantial basis, 1923 having proved an active and prosperous year for the steel companies. The buying period began in the early part of the year and ran through the first 6 months. Most of the plants reached capacity during the first 3 months. The low period of production and orders on hand was reached several months ago, but the orders for new business are once more increasing. The steel plants throughout the country at the present time are running at about 75 per cent capacity.

"Another index of what has taken place in the period of 12 months is the railroad record of the country with relation to car loadings, which shows a volume of traffic never before equaled in the history of the country. Through the practice of economies and the evidence of good management in every particular, the railroads last year were able to earn the highest per cent on capital investment that has thus far been recorded under the transportation act, slightly over 5 per cent. There were unfortunate developments in the case of certain roads, as, for instance, those of the Northwest, but the conditions were localized and cannot be taken as any index to the entire railroad situation.

"Another favorable development of the last year has been the better position established in government finances by substantial reduction of the public debt, and no more constructive plan has been put forth for general business and financial stability than the proposed reduction in taxes as outlined and presented to congress by Secretary Mellon. This was of last year, but it is in the legislative program of this year that the proposal must be acted upon.

"A question of doubt, and one which probably is in the minds of most every person, is the uncertainty that exists as to the political outlook in Washington. It is something that pervades all lines of endeavor, for the reason that adverse legislation strikes not at one industry alone, but at the basic foundations of industry, and there is a so-called radical element in congress which seems to take glory in the fact of being able to obstruct legislation, even though it is apparently without the power to bring about its own particular trend of adverse legislation. The very fact, however, that certain avenues of attack will probably be entered upon is disturbing, even though the aim desired seems impossible of attainment. Undoubtedly the railroads will come under this fire, which will be centered upon the transportation act, and it is hardly necessary to say that anything which is undertaken to give a setback to the partial recovery of the railroads would be dangerous to the country at large in the ramifications of its various business endeavors. The tax plan which would benefit industry is already under attack, with support being ranged up for the soldier bonus, the passage of which in itself would automatically defeat the tax reduction."

Outlooks from other points of view are equally encouraging. Thus the head of one of the most important banking institutions in New York is reported as thinking that:

"American industry faces the prospect of an even better 1924 than was experienced in 1923, itself a year of good business. Not the least important among the calculations causing bankers to have confidence in the year ahead, is the accumulation of indications that a heavy tax burden would be lifted, at least in substantial measure. A booming period in which prices run away from themselves is not forecast, but a continuation of good business with further expansion in the spring months appears certain.

"The problems of labor, prices, agriculture, taxes, politics, foreign affairs and reduced profits are holding imagination so far in check that business in general is moving along at a steady and careful rather than an excited pace. Activity is less at the moment than it has been for a number of months past, and it is conceivable that it may slip downward further before there is an upturn. However, there is immediately in sight nothing resembling a period of business depression."

Another New York banker is quoted as saying, apropos of the business outlook that:

"A balancing of factors in the business situation includes among the favorable features the maintenance of an extraordinarily large volume of retail sales, conservative inventories in most lines, almost full employment of labor at high wages, a more nearly stable average of prices and a better balance between particular prices, an improved economic position of the farmers as a group, a larger volume of exports, and abundant banking resources, with moderate interest rates.

"On the other hand, the continuing recessions in some basic branches of production, excessive labor costs, hesitancy in forward buying, excessive producing capacity in some lines, some particularly embarrassing price situations (such, for example, as those confronting producers of wheat and livestock), the agitation in behalf of unsound legislative proposals, uncertainty as to European developments—all combine to restrain in some degree business confidence.

"The relative significance of these several elements of the business situation is suggested by recent trends. A review of the year's developments shows that during 1923 constructive influences were dominant. It was a period of real, although irregular, prosperity. Resistance was strong against extreme tendencies toward either unwholesome expansion or unnecessary hesitation and retrenchment.

"The peak of the fall demand for bank credit was met without strain. Money is plentiful and business is borrowing only on an essential scale. There is very little speculative borrowing for the carrying of commodities.

"The physical volume of exports, allowance being made for price changes and seasonal variations, has shown a marked increase since May, indicative of a distinct improvement in foreign markets for American goods.

"The United States is so strongly buttressed by natural advantages and so largely self-contained economically that it is immune from the most serious reactions of the European situation. It has its own vast domestic market, as well as other non-European markets, as outlets for its products. But the fact remains that it is very definitely to the interest of the United States to have Great Britain and the continental countries regain their normal prosperity as early as possible, for general economic well-being throughout the world will continue to be diminished to a degree so long as Europe is unable to play its appropriate part in production and trade or to carry its share of the world's burden."

Since by far the greater part of building construction must be done with the aid of funds obtained from the financial institutions which specialize in building loans, it is interesting to have the opinion of S. W. Straus, the president of the great house of S. W. Straus & Co.: "No man can read the future, but there is at the present time no reason apparent why the year 1924 should not be in a general way as favorable for building conditions as 1923, when building conditions, including new structures and alterations, amounted to approximately $5,000,000,000."

# SERVICE SECTION
# *of* THE ARCHITECTURAL FORUM

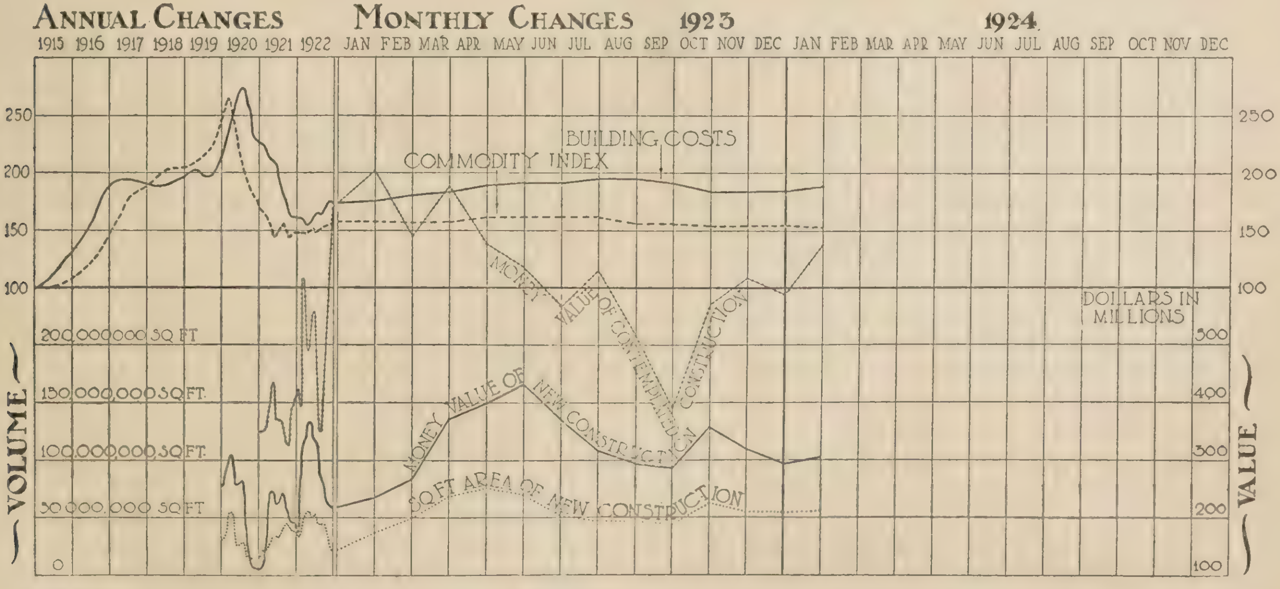
**Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee**

## The Building Situation

THE building reports for the month of January indicate the opening of a period of unusual activity in new construction early in 1924. The total value of new contracts let in January establishes a record for that month greater than reported figures of any January in past years. As indicated on the chart below, the volume of plans filed, already high in November and December of last year, has increased materially in the month of January, indicating the probability of a continued upward trend of the line showing money value of new construction. Prices of building materials seem to have reached a point of temporary stability, but it seems obvious that a great demand will develop in the spring building season, and for this reason those who contemplate new building projects would do well to make all possible commitments at this time in order to insure delivery.

The building material manufacturing industry is in a somewhat better condition this year to absorb a heavy demand in the spring season, because production is established on a better basis and the transportation situation has improved for the delivery of raw materials and finished products. The settlement of the bituminous coal controversy insures an ample supply for manufacturers, and with the coal and rail situation on a reasonably good basis, it would seem that service to the building industry should be better than a year ago. The cost of labor, skilled and unskilled, continues at approximately the same rates in industrial plants and probably on a somewhat higher basis in the building industry. Apparently no decrease in the cost of building is to be anticipated in 1924, except as it may be influenced by seasonal conditions.

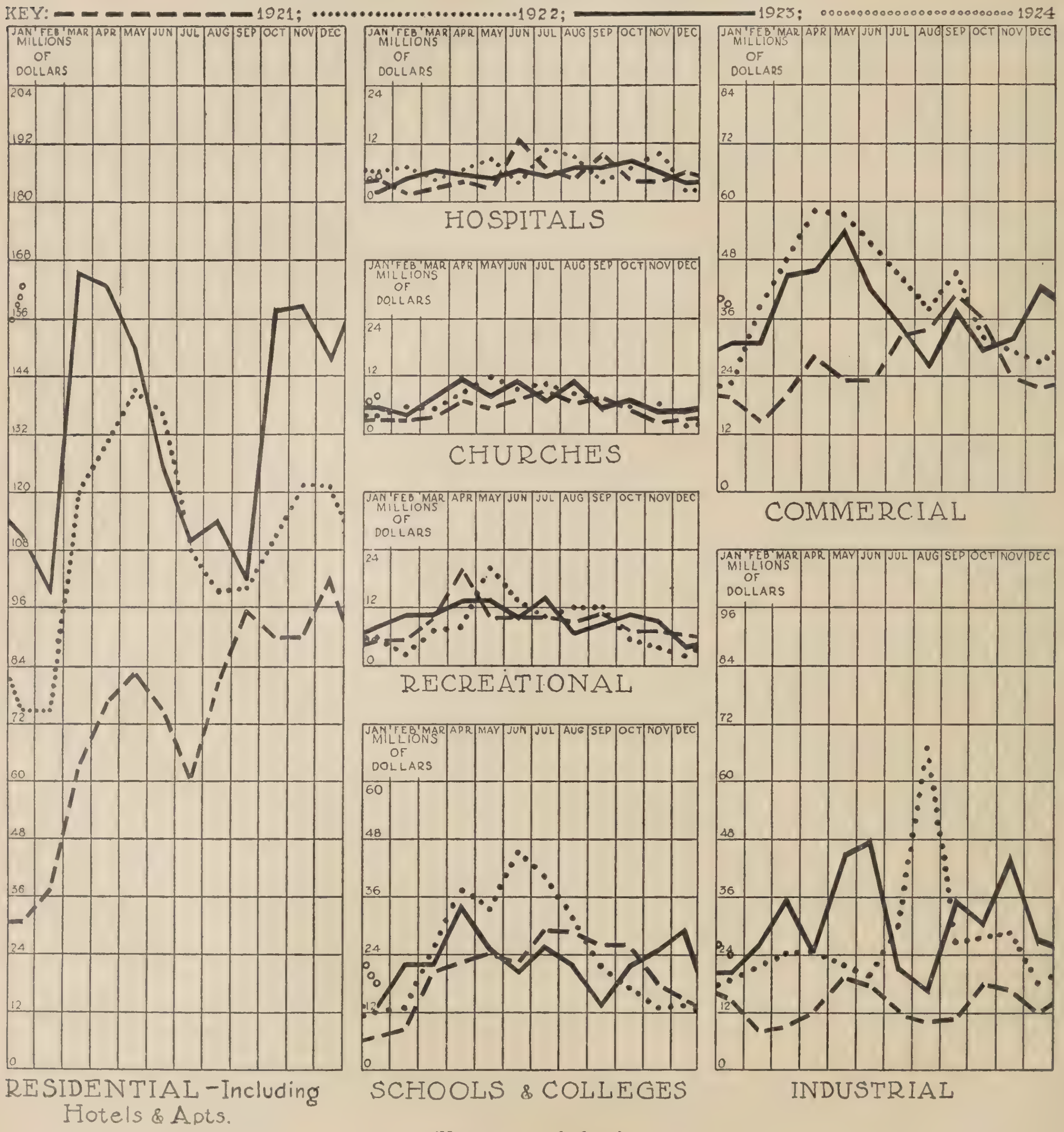
It is apparent that large sums of mortgage money will be available to finance the great volume of anticipated building construction. Reports from investment companies specializing in mortgage bonds indicate considerable interest on the part of the public and the availability of large funds. Similarly, in banking and insurance circles the supply of mortgage money would appear to be ample, and as the cost of building has become fairly well stabilized at high levels, there is some tendency toward somewhat more liberal appraisals than in previous years.



THESE various important factors of change in the building situation are recorded in the chart given here: (1) *Building Costs.* This includes the cost of labor and materials; the index point is a composite of all available reports in basic materials and labor costs under national averages. (2) *Commodity Index.* Index figure determined by the United States Department of Labor. (3) *Money Value of Contemplated Construction.* Value of building for which plans have been filed based on reports of the United States Chamber of Commerce, F. W. Dodge Co., and *Engineering News-Record.* (4) *Money Value of New Construction.* Total valuation of all contracts actually let. The dollar scale is at the right of the chart in millions. (5) *Square Foot Area of New Construction.* The measured volume of new buildings. The square foot measure is at the left of the chart. The variation of distances between the value and volume lines represents a square foot cost which is determined first, by the trend of building costs, and second, by the quality of construction.

# Monthly Analysis of the Trend of Building Activity

A study of the value of contracts let each month in seven important types of buildings — with graphic comparisons for the three preceding years



(Key at top of chart)

## JANUARY 1924 CONTRACTS

Because of the unusual volume of contracts let in the month of January, practically all of the above building types are influenced. In the residential field, which includes also hotels and apartments, it will be seen that January has opened with a total of contracts let considerably higher than in January of the previous three years. All of these types except recreational buildings show some increase for January over the same month in previous years. Unless the year 1924 shows an unusual reversal as compared to previous years, it is anticipated that in March and April all records will be broken in the amount of money expended for residential construction. A factor of added interest, although impossible to record, is that great activity is anticipated in the remodeling of old buildings, particularly in the moderate cost dwelling field, and the making over of old city houses into small or medium sized apartments to secure better returns.

# BUILDING MATERIAL PRICES

Table Showing Average Prices Paid by Contractors for Building Materials at Local Distributing Points as of February 1, 1924. Prepared by Division of Building and Housing of the Bureau of Standards from Prices Secured through the Bureau of Census

| Commodities | Size or Condition | Unit | Fitchburg | Haverhill | New London | Pittsburgh | Erie | Baltimore | Richmond | Fairmont | Columbia | Savannah | Detroit | Flint | Bay City | Saginaw | Shreveport | Grand Forks | Sioux Falls | San Antonio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Brick |  | 1,000 | 24.00 | 28.00 | 27.00 | 17.00 | 17.75 | 20.00 | 19.00 | 26.00 | 12.00 | 14.00 | 17.50 | 16.00 | 18.00 | 15.00 | 15.00 | 15.00 | 18.00 | 17.00 |
| Portland Cement | Excl. of containers | Bbl. | 3.25 | 3.60 | 3.60 | 2.85 | 3.40 | 3.10 | 3.50 | 2.85 | 3.50 | 3.00 | 3.40 | 2.75 | 2.75 | 3.25 | 3.20 | 3.20 | 3.00 | .... |
| Yellow Pine No. 1 | Dimension 2x4-16′ S1S1E | M | .... | .... | .... | 52.00 | 48.00 | 40.00 | 32.00 | .... | .... | 30.00 | 40.00 | 45.00 | 50.00 | 55.00 | 47.00 | .... | .... | 50.00 |
| Douglas Fir No. 1 | Dimension 2x4-16′ S1S1E | M | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47.00 | 47.00 | .... |
| N. Carolina Pine No. 1 | Dimension 2x4-16′ S1S1E | M | .... | .... | .... | .... | 48.00 | .... | .... | 51.00 | 25.00 | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Common Boards No. 1 | 1x6 | M | 55.00 | 52.00 | 45.00 | 50.00 | 47.00 | 42.50 | 32.00 | 50.00 | 25.00 | 30.00 | 40.00 | 42.00 | 42.00 | .... | 32.00 | 43.00 | 47.00 | 52.50 |
| Y.P. Flooring Edge Grain "C" | 1x4-10′-16′ | M | .... | 128.00 | .... | .... | .... | 135.00 | .... | 100.00 | 95.00 | .... | .... | 80.00 | 80.00 | 100.00 | 105.00 | .... | .... | 105.00 |
| Douglas Fir V. G. No. 2 | 1x4-10′-16′ | M | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 85.00 | 85.00 | .... |
| Red Cedar Shingles | Extra clear 16″ 5 to 2 | M | .... | 6.20 | 6.00 | 6.25 | 6.75 | 11.20 | 7.20 | 7.25 | .... | .... | 5.50 | 6.00 | 6.00 | 6.50 | 5.85 | 5.40 | 5.25 | .... |
| Cypress Shingles | Extra clear 16″ 5 to 2 | 100 sq. ft. | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 6.30 | .... | .... | 7.50 |
| Composition Shingles | Crushed slate surfaced | 100 sq. ft. | .... | .... | .... | 6.50 | 6.25 | .... | 5.48 | 6.25 | 6.25 | 6.25 | 6.00 | 6.25 | 6.25 | 6.50 | 6.90 | .... | 7.50 | 9.00 |
| Gypsum Plaster Board | ⅜″ | 1,000 sq. ft. | .... | 45.00 | 50.00 | 37.50 | 45.00 | .... | 40.00 | 32.00 | 35.00 | .... | 30.00 | 45.00 | 40.00 | 45.00 | 45.00 | .... | 32.00 | 47.50 |
| Lime | Hyd. Com. | Ton | 25.00 | 20.00 | 26.00 | 23.00 | 22.00 | .... | 17.50 | 18.00 | 17.50 | 17.50 | 18.00 | 20.00 | 18.50 | 18.00 | 25.00 | 23.00 | 24.00 | 20.00 |
| Building Sand |  | Cu. yd. | 1.80 | 2.50 | 1.65 | 2.50 | 2.50 | 2.00 | 2.25 | 3.75 | 1.25 | .... | 2.75 | .... | 2.25 | 2.75 | 2.25 | 2.70 | 1.25 | 2.37 |
| Crushed Stone | ¾″ | Ton | 3.25 | 2.50 | .... | 5.50 | 3.50 | .... | .... | 3.00 | 2.75 | 4.40 | 2.35 | .... | 2.50 | 3.50 | 3.20 | .... | 1.85 | 2.75 |
| Wire Nails |  | Keg | 4.10 | 4.90 | 5.05 | 3.50 | 3.50 | 3.50 | 4.05 | 4.00 | 4.25 | 3.95 | 4.25 | 3.75 | 3.80 | 3.65 | 4.60 | 5.50 | .... | 6.30 |
| Window Glass | Single A 10″x12″ | 50 sq. ft. | 4.80 | .... | 4.27 | .... | .... | 4.80 | 5.80 | 5.25 | .... | .... | 3.90 | 4.25 | 4.75 | .... | 5.10 | .... | 6.00 | .... |
| Hollow Tile | 8″x12″x12″ | Each | .30 | .30 | .32 | .19 | .21 | .20 | .20 | .24 | .17 | .... | .20 | .... | .17 | .24 | .22 | .... | .19 | .21 |
| Cast Iron Soil Pipe | 4″ E.H. 13 lbs. per ft. | Ton | .... | .... | .... | .... | .... | .... | .... | 88.00 | .... | .... | .... | .... | 85.00 | 78.46 | 106.25 | 96.92 | .... | 129.36 |
| Steel Pipe | 1″ galv. | 100 ft. | .... | .... | .... | 9.86 | .... | 9.88 | 10.00 | 10.00 | 11.87 | 9.46 | .... | .... | 10.00 | 10.00 | 11.95 | .... | .... | 12.36 |
| Reinforcement Bars | ¾″ square | 100 lbs. | 4.00 | .... | .... | 3.50 | .... | 3.60 | 3.35 | 3.50 | 4.60 | 5.00 | 3.50 | .... | 3.50 | .... | 4.00 | .... | .... | 4.00 |
| Structural Steel | Fab. 6″ I-beams | 100 lbs. | .... | .... | .... | 3.25 | .... | 3.75 | 4.50 | 6.00 | 5.00 | 5.00 | 6.00 | .... | 4.80 | 5.00 | 6.50 | .... | .... | 4.50 |
| White Lead | Dry | 100 lbs. | .... | 14.00 | 14.50 | 14.50 | .... | 14.25 | 15.00 | 14.00 | 15.00 | 14.75 | .... | 14.00 | 14.00 | 12.25 | 15.25 | 16.00 | .... | 15.75 |
| Zinc Oxide | Am. process lead free | 100 lbs. | .... | .... | .... | 15.00 | .... | .... | .... | .... | 22.50 | 20.00 | .... | .... | .... | 16.00 | .... | .... | .... | 16.00 |
| Gypsum Plaster | Neat | Ton | 24.00 | .... | 26.00 | 22.00 | 24.00 | 19.00 | 19.50 | 19.00 | 19.00 | 21.50 | 21.00 | 17.00 | 17.00 | 16.00 | 24.00 | 23.00 | 14.50 | 24.00 |
| Linseed Oil | Raw in bbls. | Gal. | .... | 1.05 | 1.35 | .95 | .... | 1.00 | 1.12 | 1.30 | 1.25 | 1.05 | .... | .... | 1.10 | .85 | 1.55 | 1.50 | .... | 1.10 |
| Roofing Slate | No. 1 ribbon | 100 sq. ft. | .... | .... | .... | 13.50 | .... | .... | 13.50 | 12.50 | .... | .... | .... | .... | 17.50 | .... | 12.00 | .... | .... | 17.60 |
| Tar Paper, Roofing | 2-ply 75 lbs. per roll of | 100 sq. ft. | .... | 2.75 | .... | 1.95 | .... | .... | .... | .... | .... | 1.95 | 2.25 | 2.75 | 2.75 | 2.80 | 2.75 | .... | 3.75 | 3.50 |
| Rosin Sized Sheathing | 3-ply 30 lbs. per roll of | 500 sq. ft. | .... | 1.60 | .... | 1.35 | 1.40 | 1.25 | 1.50 | 1.25 | .... | .... | 1.40 | 1.50 | 1.20 | 2.10 | 1.40 | 1.80 | 1.50 | 1.80 |

| Commodities | Size or Condition | Unit | Poughkeepsie | Syracuse | Rochester | Buffalo | Cleveland | Akron | Lorain | Dayton | Waterloo | Des Moines | Council Bluffs | Spokane | Seattle | Portland Oreg. | Milwaukee | Tucson | Los Angeles | Newark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Brick |  | 1,000 | 20.00 | 20.00 | 17.75 | 23.00 | 16.00 | 16.00 | 20.00 | 18.00 | 16.50 | 19.00 | 16.50 | .... | 15.00 | 20.00 | 13.50 | 15.00 | 15.50 | 18.00 |
| Portland Cement | Excl. of containers | Bbl. | 2.90 | 3.30 | 3.35 | 3.03 | 3.40 | 3.20 | 3.40 | 3.60 | 2.90 | 3.10 | 2.90 | 2.98 | 3.40 | 3.55 | 2.45 | 3.60 | 3.36 | 3.35 |
| Yellow Pine No. 1 | Dimension 2x4-16′ S1S1E | M | .... | 60.00 | .... | 55.00 | 58.00 | 45.00 | 55.00 | 57.50 | 52.00 | 52.00 | 50.00 | .... | .... | .... | 40.00 | .... | .... | 50.00 |
| Douglas Fir No. 1 | Dimension 2x4-16′ S1S1E | M | 45.00 | .... | 56.00 | 60.00 | .... | .... | .... | .... | 52.00 | 52.00 | 48.00 | 30.00 | 24.00 | 24.50 | .... | 62.00 | 41.50 | .... |
| N. Carolina Pine No. 1 | Dimension 2x4-16′ S1S1E | M | .... | 42.00 | 48.00 | .... | .... | .... | .... | 52.50 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Common Boards No. 1 | 1x6 | M | 38.00 | 39.00 | 45.00 | 50.00 | 48.00 | 45.00 | 50.00 | .... | 47.00 | 54.00 | 48.00 | 29.00 | 23.00 | 24.50 | 42.00 | 57.00 | 40.00 | 47.50 |
| Y.P. Flooring Edge Grain "C" | 1x4-10′-16′ | M | 130.00 | 105.00 | 130.00 | .... | 90.00 | .... | 105.00 | .... | 98.00 | 106.00 | 110.00 | .... | .... | .... | .... | .... | .... | 95.00 |
| Douglas Fir V. G. No. 2 | 1x4-10′-16′ | M | .... | 90.00 | .... | 115.00 | .... | .... | .... | 90.00 | 98.00 | 95.00 | 98.00 | 80.00 | 62.50 | 58.00 | .... | 95.00 | 82.75 | .... |
| Red Cedar Shingles | Extra clear 16″ 5 to 2 | 100 sq. ft. | .... | 6.25 | 6.00 | 6.75 | 6.00 | 6.00 | 6.50 | 6.20 | 6.50 | 6.50 | 6.25 | .... | 3.75 | .... | 5.75 | 5.50 | 4.06 | 6.50 |
| Cypress Shingles | Extra clear 16″ 5 to 2 | 100 sq. ft. | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Composition Shingles | Crushed slate surfaced | 100 sq. ft. | .... | 6.00 | .... | .... | 6.25 | .... | .... | 6.50 | 7.50 | 6.00 | .... | .... | .... | .... | 6.50 | .... | .... | 6.50 |
| Gypsum Plaster Board | ⅜″ | 1,000 sq. ft. | 50.00 | 32.50 | 30.00 | 45.00 | 32.00 | 26.00 | .... | .... | 36.00 | 40.00 | 35.00 | .... | 35.00 | 40.00 | 40.00 | 50.00 | 35.00 | ... |
| Lime | Hyd. Com. | Ton | 22.00 | 20.00 | 20.00 | 16.00 | 20.00 | 20.00 | 18.00 | 15.20 | 20.00 | 20.00 | 21.00 | 20.00 | 24.00 | 26.00 | 16.00 | 30.00 | 26.50 | 17.50 |
| Building Sand |  | Cu. yd. | 2.50 | 1.80 | 2.25 | 1.48 | 2.50 | 2.50 | 2.50 | 2.00 | 1.50 | 2.00 | 3.50 | .... | 1.85 | 2.00 | 1.75 | 1.25 | 1.75 | 2.50 |
| Crushed Stone | ¾″ | Ton | 3.00 | 2.25 | 2.25 | 1.30 | 3.50 | 3.25 | 2.65 | 2.00 | 3.00 | 4.30 | 4.00 | .... | .... | .... | 2.67 | 3.00 | 3.10 | .... |
| Wire Nails |  | Keg | 5.05 | 4.00 | 4.25 | 4.25 | 3.60 | 3.80 | 3.15 | 3.90 | 4.50 | 4.25 | .... | 4.85 | 4.35 | 4.50 | 3.80 | 6.00 | 4.25 | 3.80 |
| Window Glass | Single A 10″x12″ | 50 sq. ft. | .... | 4.50 | 4.20 | 4.20 | .... | 4.50 | .... | 4.50 | 5.25 | 4.75 | .... | 4.43 | .... | 5.00 | 5.25 | .... | 4.38 | 4.00 |
| Hollow Tile | 8″x12″x12″ | Each | .21 | .25 | .18 | .20 | .... | .17 | .19 | .21 | .17 | .... | .... | .20 | .20 | .20 | .17 | .18 | .20 | .18 |
| Cast Iron Soil Pipe | 4″ E.H. 13 lbs. per ft. | Ton | .... | 80.00 | 79.23 | 63.05 | 73.46 | 70.15 | .... | 72.00 | 82.00 | 90.00 | .... | 88.00 | 95.00 | 113.00 | .... | .... | 75.19 | .... |
| Steel Pipe | 1″ galv. | 100 ft. | .... | 10.51 | 10.52 | 10.51 | 10.90 | 10.36 | .... | 10.57 | 12.00 | 11.00 | .... | 11.50 | 11.85 | .... | 9.75 | .... | 11.30 | 10.40 |
| Reinforcement Bars | ¾″ square | 100 lbs. | 4.50 | 4.00 | 3.70 | 2.75 | 3.35 | 3.90 | 3.65 | .... | 4.00 | 3.50 | 3.25 | 4.40 | 4.00 | 4.00 | 3.60 | 4.50 | 4.25 | .... |
| Structural Steel | Fab. 6″ I-beams | 100 lbs. | 5.00 | .... | 4.70 | 3.65 | 3.46 | 3.50 | .... | .... | 4.95 | 5.25 | .... | .... | 5.75 | 5.50 | 6.00 | .... | 6.00 | .... |
| White Lead | Dry | 100 lbs. | .... | 14.25 | 13.00 | 14.25 | 14.25 | 14.50 | .... | 14.50 | 14.50 | 14.50 | 15.50 | 14.50 | 13.50 | .... | .... | 15.00 | 13.50 | 13.50 |
| Zinc Oxide | Am. process lead free | 100 lbs. | .... | .... | .... | .... | .... | .... | .... | 15.00 | 14.75 | 14.75 | .... | 14.00 | .... | .... | .... | .... | 13.00 | .... |
| Gypsum Plaster | Neat | Ton | 21.00 | 19.25 | 18.00 | 17.00 | .... | 19.00 | 17.20 | 18.00 | 18.00 | 18.00 | 17.00 | 20.00 | 21.00 | 21.00 | .... | 20.00 | 17.80 | 19.00 |
| Linseed Oil | Raw in bbls. | Gal. | .... | 1.05 | 1.33 | 1.06 | 1.02 | 1.00 | .... | 1.20 | 1.30 | 1.20 | .... | 1.04 | 1.08 | 1.25 | 1.04 | .... | 1.04 | 1.00 |
| Roofing Slate | No. 1 ribbon | 100 sq. ft. | .... | 14.00 | 15.00 | .... | .... | 13.50 | .... | 15.00 | 18.00 | 18.00 | .... | .... | .... | .... | 17.50 | .... | .... | 13.50 |
| Tar Paper, Roofing | 2-ply 75 lbs. per roll of | 100 sq. ft. | .... | 2.25 | 2.50 | 2.00 | 2.50 | 2.75 | .... | 1.80 | 3.25 | 2.75 | .... | 3.10 | .... | .... | 2.45 | 3.50 | 3.75 | 2.25 |
| Rosin Sized Sheathing | 3 ply 30 lbs. per roll of | 500 sq. ft. | .... | 1.50 | 1.25 | 1.50 | .90 | .85 | .... | .... | 1.40 | 1.40 | 1.40 | 1.41 | 1.50 | 1.80 | 1.15 | 1.75 | 1.50 | 1.20 |

# THE FORUM CONSULTATION COMMITTEE

## A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

THE editors of THE ARCHITECTURAL FORUM have been fortunate in obtaining the co-operation of the following recognized experts who constitute THE FORUM Consultation Committee. This Committee provides a service of the greatest value to subscribers in addition to the usual editorial service and architects who seek information on specific questions in these various fields are invited to present inquiries.

The basis on which this Committee has been organized is:

(*a*) That each committee member shall be a representative leader in his line;
(*b*) That no committee member has affiliations with any manufacturer;
(*c*) That no committee member will be called upon for detailed service excepting by special arrangement;
(*d*) That a special editorial article on a subject represented under each of the headings below shall be prepared during the year by the committee member.

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Address inquiries to committee members, care THE ARCHITECTURAL FORUM, 383 Madison Avenue, New York

# THE FORUM DIGEST

## A SURVEY OF IMPORTANT CURRENT ARTICLES ON BUILDING ECONOMICS AND BUSINESS CONDITIONS AFFECTING CONSTRUCTION

The Editors of this Department select from a wide range of publications matter of definite interest to Architects which would otherwise be available only through laborious effort

# Air Leakage Through Window Openings

*By* F. C. HOUGHTEN *and* C. C. SCHRADER, *Pittsburgh, Pa.*

*Reports of Coöperative Work by A. S. H. & V. E. Laboratory and the U. S. Bureau of Mines Experiment Station*

HEAT is lost from buildings in two ways: *First,* by transmission and *Second,* by infiltration. Both sources of heat loss are of vital concern to the heating and ventilating engineer, the architect and the owner. Both are difficult of exact measurement and determination of constants which may be used in practice with the desired engineering accuracy. As a result, the calculation of heat loss from buildings probably involves a greater element of chance than any other engineering problem.

The great need for information regarding infiltration led to an investigation of the leakage of air through and around all types of windows and doors by the Research Laboratory of the American Society of Heating and Ventilating Engineers, in coöperation with the American Institute of Architects and the U. S. Bureau of Mines, according to the *Journal of the American Society of Heating and Ventilating Engineers.* The architect is interested in the relative leakage of air through various types of windows and doors, with and without weatherstripping.

This report deals with the method employed in the investigation of and results obtained for double-hung windows, 2 ft. 8 in. x 5 ft. 2 in. x 1⅜ in., in a 13-in. brick wall, plastered on the inside with cement plaster. Results are given for the leakage, through such a window without weatherstripping, with two types of weatherstripping around the frame, and through the brick wall itself.

Leakage of air through cracks around windows and doors, cracks in walls, and through the porous materials of which walls are made, takes place in accordance with two physical laws. *First,* there is an interchange of air through the wall by diffusion; *Second,* there may be a current of air through the wall caused by a pressure difference set up by the impinging wind. The first goes on at all times, is independent of wind velocity, and is probably negligible. The second takes place only when there is a pressure difference between the two sides of the wall. Such a pressure difference exists whenever the wind blows against the surface of the wall or whenever the direction of the wind toward the wall is changed. For any given velocity of wind striking the wall at right angles, there is always

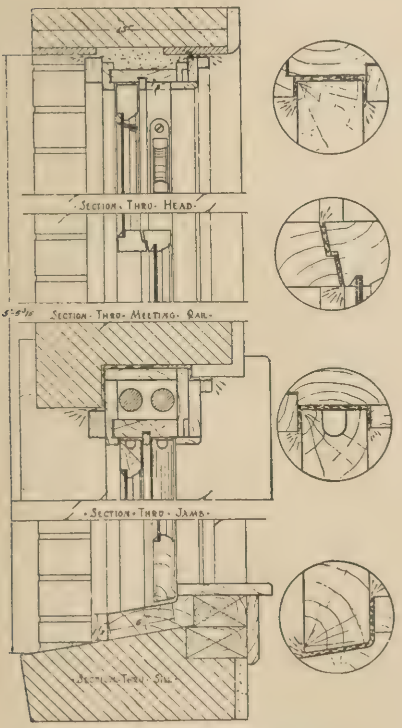


Fig. 3. Details of Window without Weatherstripping

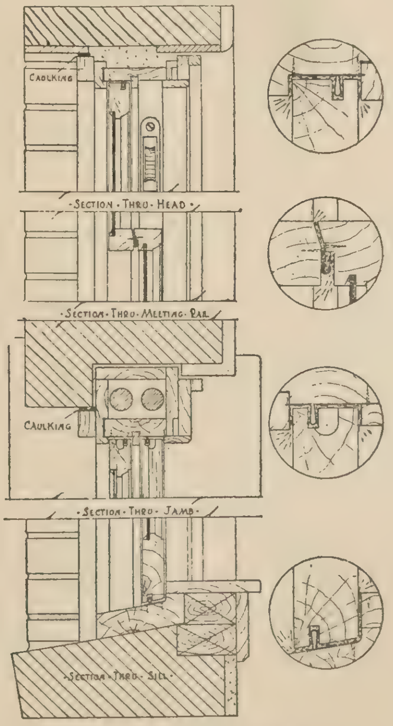


Fig. 4. Details of Window with Rib Type Weatherstripping

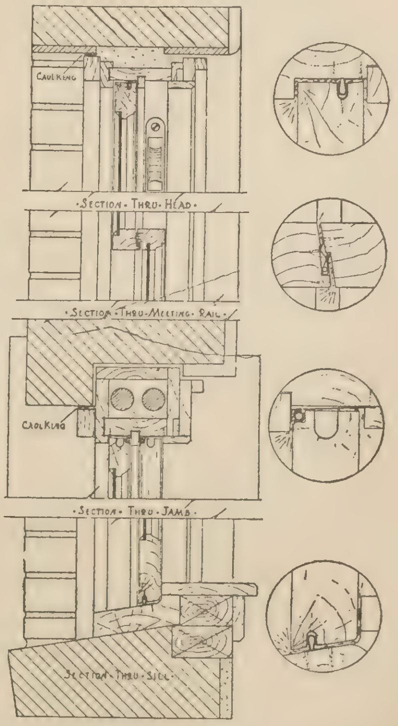


Fig. 5. Details of Window with Interlocking Type Weatherstripping

a definite pressure produced at the surface which tends to cause leakage of air through cracks. The amount of air leakage for any crack for a given pressure difference is the same regardless of whether this pressure is produced by wind or other cause.

Uniform air velocities over a large area for a long period of time are hard to produce and difficult to duplicate. It is much easier to produce and duplicate pressure differences on the two sides of a window by means of a blower. It was, therefore, decided that for this investigation the apparatus should be so designed that a blower could be used to produce a pressure drop through the test window built in a section of wall.

## Preliminary Tests

Preliminary tests were made in order to study the working of the apparatus itself and in order to differentiate between the various channels of leakage through the window and wall. Leakage through the window may be divided into the following parts: *First,* that which passes through the cracks, around the sash perimeter which are subject to weatherstrip application; *Second,* that which passes through the cracks between the frame and the brick and can be eliminated by calking under the staff bead or brick mold. This may be called the frame leakage. *Third,* leakage through other cracks in the frame or sash which cannot be eliminated by either weatherstripping or calking and may be called the "elsewhere" leakage.

Before making the first series of tests, the joint between the brick and the chamber wall was calked so that all leakage would take place through the wall or window. In all other respects, the wall and window were in the condition in which they were left by the mechanics, the sash having been fitted as tight as would allow free sliding, though probably tighter than would be allowable in actual construction because of swelling in rainy or damp weather. The window was left unlocked. A large number of tests were made with various pressure drops through the wall, many of them being duplicated several times after opening and closing the window, in order to determine the variation due to the way in which the window was closed. No care was taken to close the window in any particular way other than to see that the lower sash was pushed down against the sill and the upper sash raised until the meeting rails were even. Curve 1, Fig. 6, shows the leakage for this condition for various pressures or wind velocities. The shape of the curve is characteristic of all curves obtained with the various conditions of the window and, as would be expected, shows the same characteristics as the curve for the flow of air through an orifice. For a pressure difference of 0.1 in. of water through the wall corresponding to a wind velocity against the wall of 14.4 miles per hr., 42 cu. ft. of air per min. passed through the window and wall. With a pressure drop through the wall of 1 in. of water, corresponding to a 45.5-mile wind velocity, 174 cu. ft. per min. passed through.

The second series of tests was made under the same conditions as the first series, excepting that the window was locked. Curve 2 shows the leakage for various wind velocities for the locked window. Locking caused a reduction in leakage of 20 cu. ft. per min. with a 14.4-mile wind and 64 cu. ft. per min. with a 45.5-mile wind. The third series of tests was made with the cracks around the sash perimeter, which are subject to weatherstrip application, sealed with a rubberized adhesive tape. This tape was tested and found to be as effective as a plastic calking compound and was more easily and quickly applied and removed. The leakage for this series of tests is given in Curve 3, and the difference between this curve and Curve 1 or 2 indicates the maximum possible reduction in leakage by a perfect weatherstrip.

Before making the next series of tests the staff bead or brick mold was removed and the crack between the frame and the brick wall calked. The brick mold was then replaced. Calking was also applied between the frame sill and the brick. The leakage for this condition is given in Curve 4 and the difference between Curve 4 and Curve 3 gives the leakage between the frame and the wall, commonly called the frame leakage.

In order to determine the elsewhere leakage, a sheet of galvanized iron was fastened by screws over the entire frame and the edges were sealed with calking compound. The leakage for this condition is given in Curve 5. The difference between Curve 4 and Curve 5 is the leakage stopped by the galvanized iron and is the elsewhere leakage.

Curve 5 shows a considerable leakage which does not go through the window opening, but through the

TABLE 1. DATA ON TESTS OF WINDOWS UNDER VARIOUS CONDITIONS

| | Leakage C.F.M. Crack Perimeter 18′ 4″ | | | | B.t.u. per Hour | | | | | | | | Radiation on Sq. Ft. 240 B.t.u. per Sq. Ft. per Hour | | | | Lb. of Coal Based on 13,000 B.t.u. and 50% Efficiency at Radiator 35°–70°Fahr. for Seven Months | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0–70°Fahr. | | | | 20–70°Fahr. | | | | 0–70°Fahr. | | | | | | | |
| | For total window | | Per ft. crack | | For total window | | Per ft. crack | | For total window | | Per ft. crack | | For total window | | Per ft. crack | | For total window | | Per ft. crack | |
| Wind velocity, M.P.H | 14 4 | 24.9 | 14.4 | 24.9 | 14 4 | 24.9 | 14.4 | 24.9 | 14 4 | 24.9 | 14.4 | 24.9 | 14 4 | 24.9 | 14.4 | 24.9 | 14.4 | 24.9 | 14.4 | 24.9 |
| Plain window—very tight—unlocked | 19 0 | 40 0 | 1 04 | 2 18 | 1445 | 3040 | 78 7 | 166.0 | 1033 | 2170 | 56.3 | 118 5 | 6 02 | 12 67 | 0.328 | 0.692 | 560 | 1180 | 30.50 | 64.3 |
| Plain Window—tight—unlocked | 22.0 | 46 0 | 1.20 | 2 53 | 1673 | 3500 | 91 3 | 192 5 | 1195 | 2500 | 65 2 | 137 5 | 6 97 | 14 60 | 0.381 | 0.802 | 648 | 1357 | 35.40 | 74.5 |
| Plain window—1/16″ to 1/4″ crack—unlocked | 46 0 | 75.0 | 2.53 | 4.08 | 3500 | 5700 | 192.5 | 310 0 | 2500 | 4075 | 137 5 | 222 0 | 14.6 | 23.80 | 0.802 | 1.290 | 1357 | 2213 | 7.45 | 120.5 |
| Rib Strip 1/16″ Crack | 9.0 | 20.0 | 0.49 | 1 09 | 685 | 1522 | 37.3 | 83 0 | 488 | 1087 | 26 6 | 59 2 | 2 86 | 6 34 | 0 155 | 0.346 | 266 | 590 | 14.45 | 32.2 |
| Rib Strip 1/8″ Crack | 11.0 | 22.5 | 0 60 | 1 25 | 837 | 1710 | 45 6 | 95.1 | 598 | 1223 | 32.6 | 67 9 | 3 48 | 7 12 | 0.190 | 0.396 | 324 | 663 | 17.70 | 36.9 |
| Rib Strip 3/16″ Crack | 15.0 | 30.0 | 0.82 | 1 63 | 1141 | 2282 | 62 2 | 124.4 | 815 | 1630 | 44.4 | 88.8 | 4.75 | 9.50 | 0.259 | 0.518 | 442 | 884 | 24.10 | 48.5 |
| Rib Strip 1/4″ Crack | 18 0 | 36.0 | 0 98 | 1.96 | 1370 | 2740 | 74.7 | 149.4 | 978 | 1956 | 53.3 | 106.6 | 5.71 | 11 42 | 0 311 | 0.622 | 531 | 1062 | 28.95 | 57.9 |
| Interlocking Strip 1/16″ Crack | 7.0 | 16 0 | 0 38 | 0.87 | 533 | 1218 | 29.0 | 66.3 | 380 | 870 | 20.7 | 47.3 | 2 22 | 5 07 | 0.121 | 0.276 | 207 | 472 | 11.23 | 25.7 |
| Interlocking Strip 1/8″ Crack | 8.5 | 18.0 | 0.46 | 0.98 | 647 | 1370 | 35.3 | 74.7 | 462 | 978 | 25 2 | 53.3 | 2.69 | 5.71 | 0.147 | 0.311 | 251 | 531 | 13.66 | 29.0 |
| Interlocking Strip 3/16″ Crack | 9.0 | 19 5 | 0 49 | 1 06 | 685 | 1483 | 37.3 | 80.9 | 489 | 1060 | 26.6 | 57.8 | 2.85 | 6.18 | 0.155 | 0.337 | 266 | 575 | 14.45 | 31.4 |
| Interlocking Strip 1/4″ Crack | 10.0 | 20 5 | 0.55 | 1.12 | 761 | 1560 | 41.4 | 85.0 | 543 | 1114 | 29.6 | 60.7 | 3.17 | 6.50 | 0.173 | 0.354 | 295 | 605 | 16.08 | 32.9 |

TABLE 2. LEAKAGE IN C.F.M.

| Wind Velocity M.P.H. | Frame 17 Ft. Perimeter | | Wall per Sq. Ft. | Elsewhere | Window with 1/16 In. Crack | | | | Perimeter 18 Ft. 4 In. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Plain | | Rib strip | | Interlocking Strip | |
| | For total window | Per ft. crack | | | For total window | Per ft. crack | For total window | Per ft. crack | For total window | Per ft. crack |
| 5 | 0.50 | 0.0294 | 0.0111 | 0.7 | 15 0 | 0.818 | 1 3 | 0.071 | 1.0 | 0.0546 |
| 7.5 | 2.3 | 0.1325 | 0.0289 | 1.8 | 24.0 | 1.31 | 3.0 | 0.164 | 2.2 | 0.1200 |
| 10 | 4.0 | 0.2350 | 0.0512 | 2.8 | 32.5 | 1.77 | 5.0 | 0.273 | 4.0 | 0.2180 |
| 15 | 8.0 | 0.4710 | 0.1110 | 5.2 | 47.5 | 2 59 | 9.7 | 0.529 | 7.8 | 0.4260 |
| 20 | 11.0 | 0.6470 | 0.1780 | 7.6 | 61.5 | 3.36 | 14 8 | 0.808 | 11.8 | 0.6440 |
| 30 | 19.0 | 1.1180 | 0.3330 | 13.6 | 89.0 | 4.86 | 25.5 | 1.390 | 20.0 | 1.0920 |
| 40 | 25.5 | 1.5000 | 0.5250 | 20.0 | 118.0 | 6.44 | 37 0 | 2.020 | 30.0 | 1.6380 |
| 50 | 31.5 | 1.8530 | 0.7150 | 26.0 | 149.0 | 8.13 | 48 5 | 2.650 | 41.0 | 2.2400 |

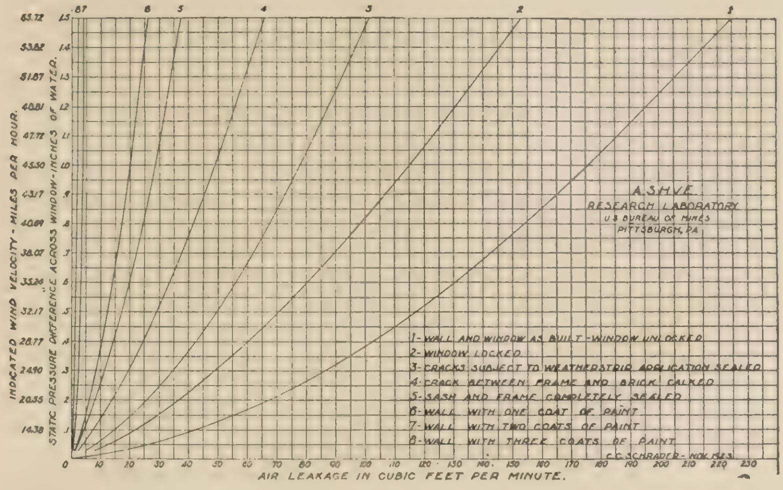


Fig. 6. Results of Tests of Leakage Through Various Parts of Window and Wall

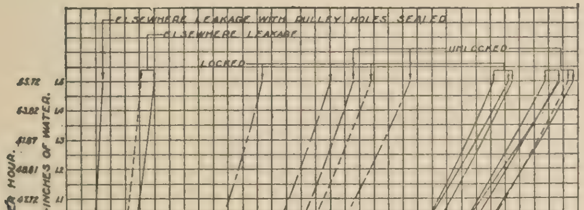


Fig. 7. Results of Tests on Windows with Various Cracks, Showing Variation in Leakage for Different Tests on Same Window

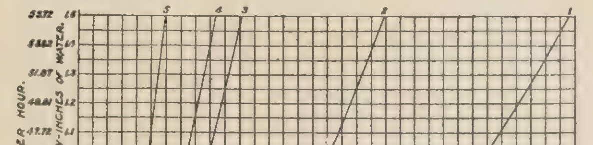


Fig. 8. Results of Tests on Windows with 1/16″ Crack Around Perimeter

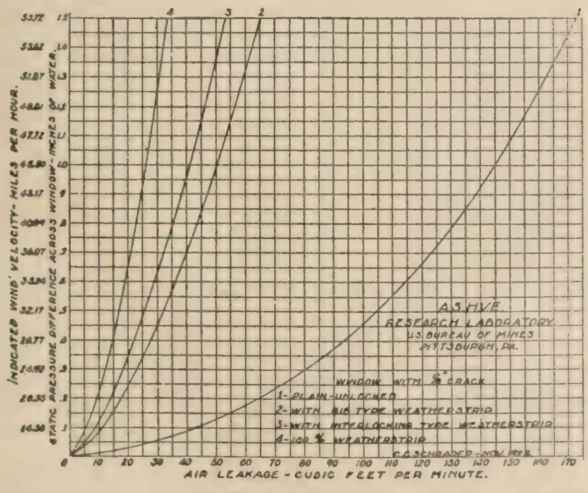


Fig. 9. Results of Tests on Window with ⅛″ Crack Around Perimeter

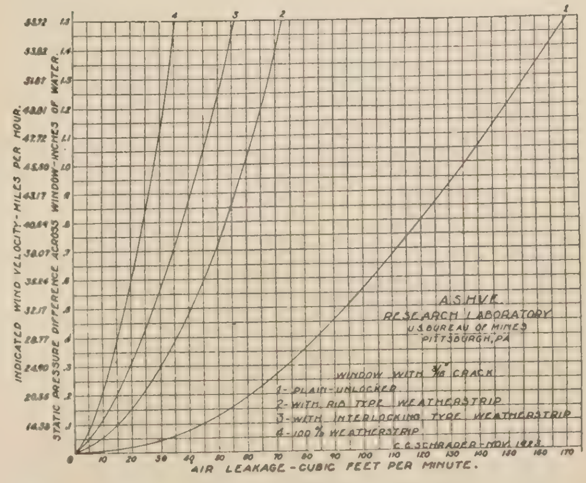


Fig. 10. Results of Tests on Window with 3/16″ Crack Around Perimeter

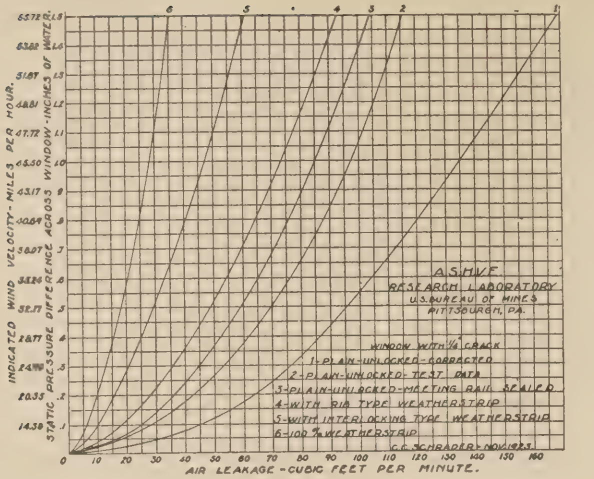


Fig. 11. Window with ¼" Crack Around Perimeter

brick wall and the plaster. To prove that this leakage was really through the brick wall, the wall was painted with one coat of asphaltum paint and another series of tests made. The result of this series is shown in Curve 6. The difference between Curves 5 and 6 represents the leakage stopped by one coat of paint. The wall was then thoroughly inspected and any visible cracks in the mortar closed with calking compound and given second and third coats of paint after each of which additional series of tests were made resulting in Curves 7 and 8, respectively. These curves show the reduction in leakage through the wall by each coat of paint. Another coat of paint was applied later and the leakage through the wall was further reduced to one-half of that shown in Curve 8. The total leakage through the entire wall had been reduced by the various processes from 4.5 cu. ft. per min. to 0.2 cu. ft. per min. for a 14.4-mile wind, and from 28 cu. ft. per min. to 0.9 cu. ft. per min. for a 45.4-mile wind. No doubt further painting would have reduced the leakage still more, but that shown by Curve 8 was so small that it was considered negligible.

## Tests on Windows with and without Weatherstripping

In these tests the sash were often changed and at least two different sash were fitted and tested for each condition. Figs. 4 and 5 show vertical sections of the window with the two types of weatherstripping together with horizontal sections through one side of the sash and frame, and also detailed sections of the various weatherstripped cracks.

The curves in Fig. 7 show the variation in data obtained for different windows fitted in the same way, for the same sash removed and replaced several times; also the leakage for tight windows and the effect of sealing the pulley holes. The five curves for the unlocked window with 1/16-in. crack show the variation which can be obtained for the same window under different conditions and for a second window fitted as nearly the same as could be done by a carpenter. The greatest variation from the mean of the five series of tests is about 4 per cent. The variation in the leakage of the same window locked shows the effect that locking may have. The main effect of locking is on the leakage through the meeting rail crack. The lock on the sash giving the three solid line curves was put on by the carpenter in the usual manner. The lock on the sash giving the curve with the short dashes was put on by a member of the laboratory staff in such a manner as to draw the meeting rails together as tightly as possible The locks on the weatherstripped windows were put on by the carpenter. Locking caused no reduction in leakage for these windows. The tight window was fitted so as to allow opening without great difficulty. The very tight window required considerable effort in opening.

Figs. 8 to 11 give the results for the various sized cracks without weatherstripping, with two types of weatherstripping, and with 100 per cent weatherstripping, that is, with the cracks subject to weatherstrip application sealed up, thus allowing only the "elsewhere" leakage. In each case the curve given is the average of several tests.

Tables 1 and 2 contain data taken from the curves Figs. 6 to 11 or resulting therefrom. Table 1 gives the leakage in cubic feet per minute for the whole window and per linear foot to crack for wind velocities of 14.4 and 24.9 miles per hour. It is of interest to note that for a plain window with crack varying from 1/16 to ¼ in. the leakage is 46 cu. ft. per min., while for the two types of weatherstripping tested it varies from 9 to 18 and 7 to 10 cu. ft. per min. respectively. The heat loss is given for two temperature differences. The heat loss for any temperature difference varies directly as the leakage. The radiation required to supply this heat loss is given for the higher temperature difference only, since it must be supplied for the maximum condition. With a 14.4-mile wind based upon the above temperature difference the unweatherstripped windows with cracks varying from 1/16 to ¼ in. required 14.6 sq. ft. of radiation, while the same windows with the two types of weatherstripping require only from 2.8 to 5.7 and 2.2 and 3.2 sq. ft. respectively. Basing cost of radiation on $2 per sq. ft. installed, the two types of weatherstripping will show a resulting decrease in first cost of radiation of about $18 and $23 per window respectively. The further saving in coal per year based upon a seven-month heating season with an average temperature difference of 35° is also given.

Table 2 gives the "elsewhere," wall, and frame leakage, and also the leakage through with the window with and without weatherstripping for various wind velocities.

Perhaps the most surprising fact brought out by this table, if not by the whole investigation, is the leakage per square foot of wall. With a 15-mile wind each square foot of the 13-in. wall, plastered on the inside, allowed the passage of 0.111 cu. ft. of air per min., while the leakage through the window and frame for the same wind velocity was 47.5, 9.7 and 7.8 cu. ft. per min. for the plain window and two types of weatherstripping respectively. The area of the window and frame is 16.25 sq. ft. giving a leakage of 2.82, 0.597 and 0.48 cu. ft. per min. per sq. ft. of window without and with the two types of weatherstripping. Based upon these figures, the leakage through the window and frame varies from 4 to 28 times that through the same area of wall. When we take into consideration the usual greater area of wall to window, it is evident that the leakage into a room is usually greater through the wall than through the window if weatherstripped, and not many times less if not weatherstripped. It is of interest to compare the heat loss through windows and walls by transmission and by leakage. The leakage for the plain window and with two types of weatherstripping all for 1/16-in. crack and a 15-mile wind is 47.5, 9.7 and 7.8 cu. ft. per min. respectively, representing a heat loss of 2580, 527 and 423 B.t.u. per hr. respectively for a 50° temperature difference. A leakage of 0.111 cu. ft. per min. per sq. ft. of wall represents a heat loss of 6.03 B.t.u. per hr. for a 50° temperature difference. Taking the transmission through the wall as 0.28 B.t.u. per hr. per sq. ft. per degree temperature difference, this loss is 14 B.t.u. per hr. for the same temperature difference. The heat loss as thus indicated by infiltration is 43 per cent as great as the heat loss by transmission as indicated by the constant used.

The values given in the table are from the tests as made and are probably somewhat higher than those actually found in practice. They represent the leakage when the pressure drop through the window is a certain value which represents a definite wind velocity at right angles to the window. If the wind strikes the window at an oblique angle, the component of the velocity at right angles to the window must be considered. Pressure difference between the outside and the inside surfaces of the window for an actual wind will be slightly less for a given velocity because of a building up of pressure within the room before the air leaks out the opposiet side of the building.

# SERVICE SECTION
## *of* THE ARCHITECTURAL FORUM

**Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee**

# The Building Situation

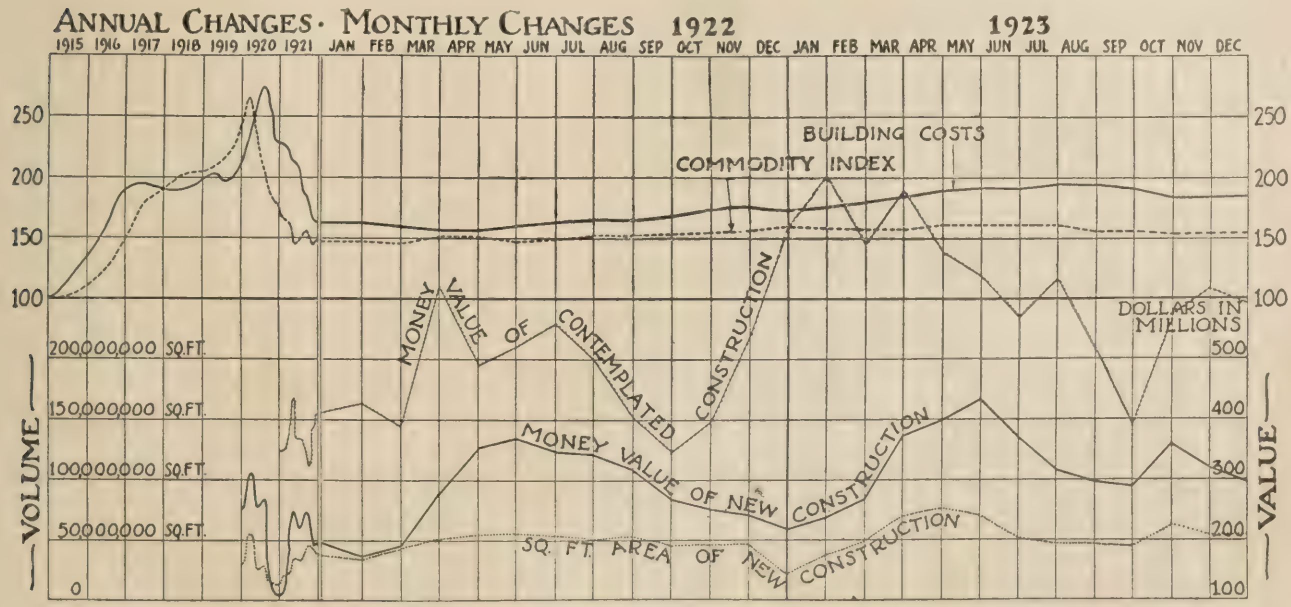
THE chart below is now completed for the year 1923 and provides an interesting opportunity for studying the trends of last year and predictions for 1924. Analyzing this chart line by line we find that building costs are trending slightly upward in December, as a result of the sudden reaction in contracts let and plans filed in October and November. It is apparent that there will be very little, if any, decrease in the cost of building indicated in the first six months of 1924.

The general commodity index is running along an approximate level, which indicates that the cost of living is fairly well stabilized for the time being. The line which indicates the money value of contemplated construction is established on a basis of the value of plans filed throughout the country. This line has shown a marked increase in the filing of plans during October, November and December, a reaction coming somewhat earlier than heretofore.

On the next page will be found a new feature of the Service Section, which is a continuous analysis of the contracts let in seven important building types. A study of these charts indicates an unusual increase in the volume of new residential building in October and November, with a seasonal falling off in December.

School building has continued to increase in volume since September of 1923, showing with December a monthly total higher than any during 1923 except April. This is an unusual condition, as will be realized by comparing with the lines on the same chart indicating activity in 1921 and 1922.

Industrial construction shows an unexpected increase in November, almost equal to May and June, which were the high months of the year. Commercial building investment has been strengthening since August, with December showing an unusual volume for that month. The other three building types indicated show no change from the usual condition at this time of the year, and this fact can be noted by the comparative paralleling of the lines for each of the three years covered in the analysis.

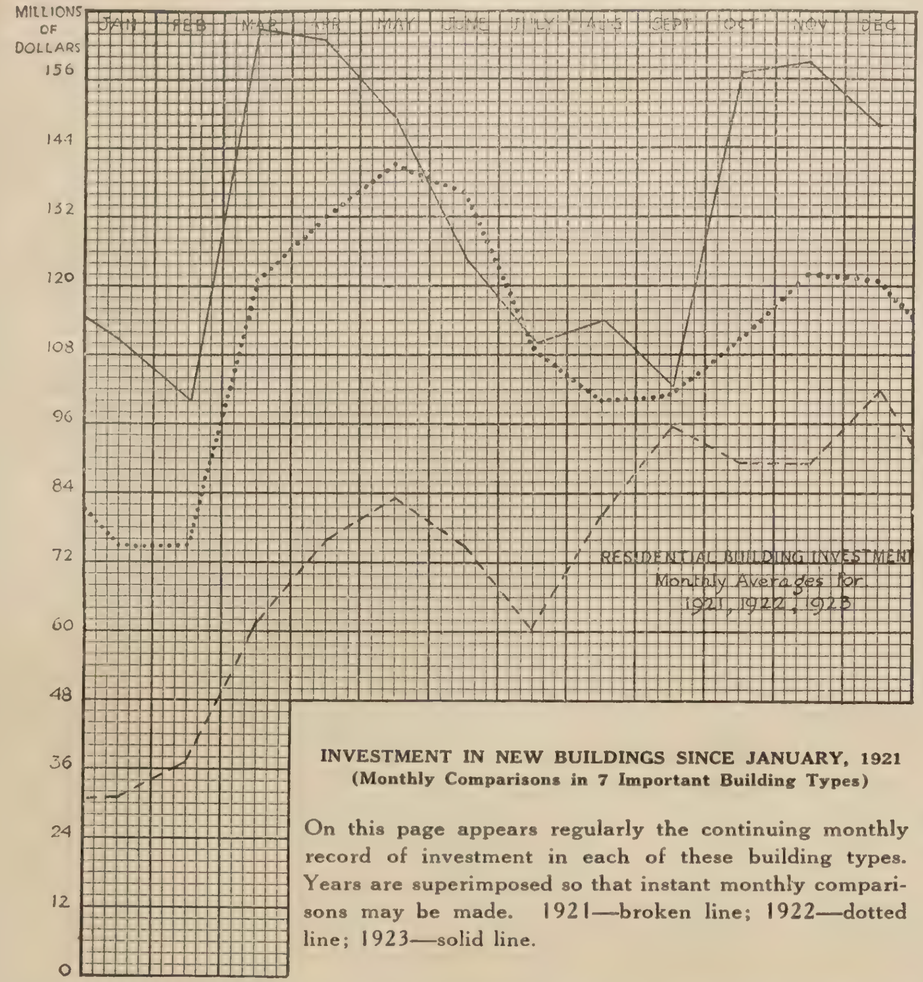


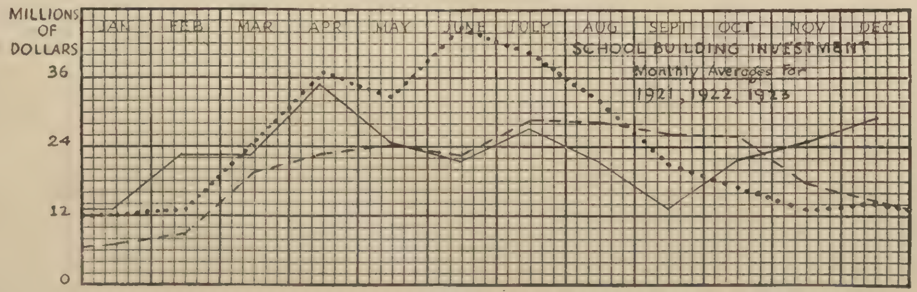
THESE various important factors of change in the building situation are recorded in the chart given here: (1) *Building Costs.* This includes the cost of labor and materials; the index point is a composite of all available reports in basic materials and labor costs under national averages. (2) *Commodity Index.* Index figure determined by the United States Department of Labor. (3) *Money Value of Contemplated Construction.* Value of building for which plans have been filed based on reports of the United States Chamber of Commerce, F. W. Dodge Co., and *Engineering News-Record.* (4) *Money Value of New Construction.* Total valuation of all contracts actually let. The dollar scale is at the right of the chart in millions. (5) *Square Foot Area of New Construction.* The measured volume of new buildings. The square foot measure is at the left of the chart. The variation of distances between the value and volume lines represent a square foot cost which is determined first, by the trend of building costs, and second, by the quality of construction.

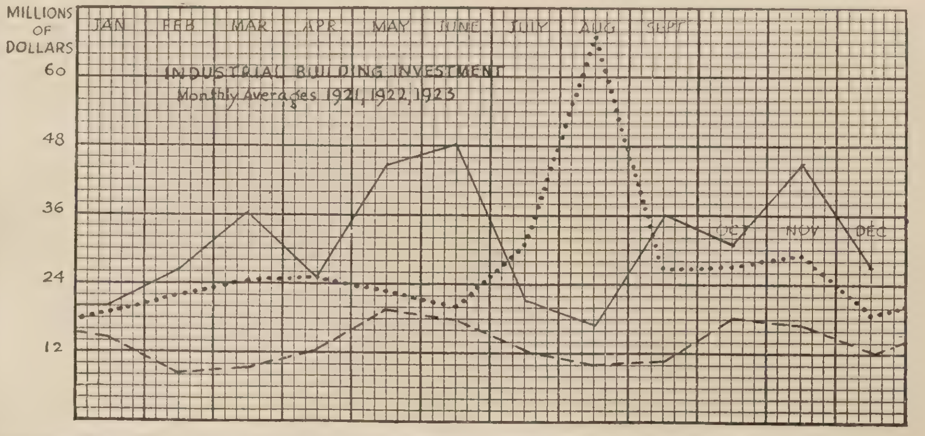
## INVESTMENT IN NEW BUILDINGS SINCE JANUARY, 1921

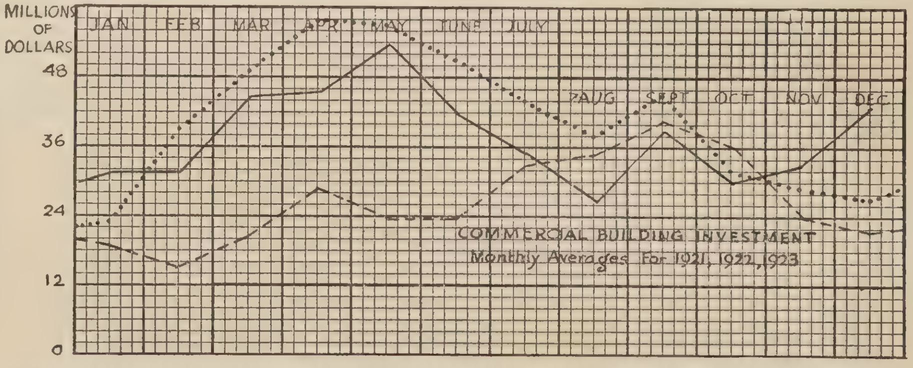
**(Monthly Comparisons in 7 Important Building Types)**

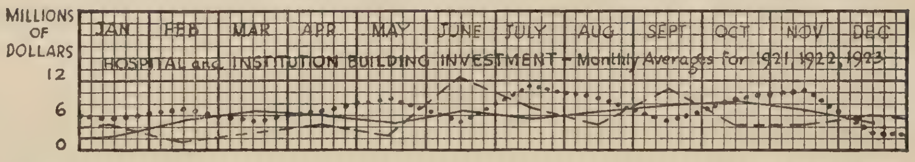
On this page appears regularly the continuing monthly record of investment in each of these building types. Years are superimposed so that instant monthly comparisons may be made. 1921—broken line; 1922—dotted line; 1923—solid line.

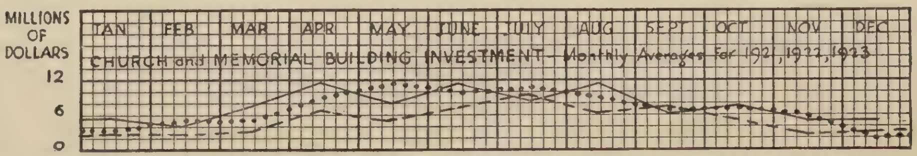


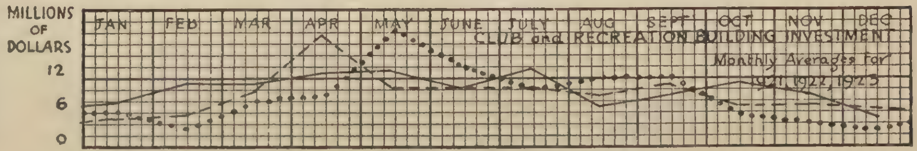












# BUILDING MATERIAL PRICES

Table Showing Average Prices Paid by Contractors for Building Materials at Local Distributing Points as of January 1, 1924. Prepared by Division of Building and Housing of the Bureau of Standards from Prices Secured through the Bureau of Census

| | | | Mass. | | Conn. | Penn. | | Md. | Va. | W. Va. | S. C. | Ga. | | Mich. | | La. | | N. Dak. | S. Dak. | N. J. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodities | Size or Condition | Unit | Fitchburg | Haverhill | New London | Pittsburgh | Erie | Baltimore | Richmond | Fairmont | Columbia | Savannah | Detroit | Flint | Bay City | Shreveport | New Orleans | Grand Forks | Sioux Falls | Newark |
| Common Brick | | 1,000 | 24.00 | 28.00 | 27.00 | 17.00 | 17.75 | 20.00 | 19.00 | 26.00 | 12.00 | 14.00 | 17.50 | 16.00 | 18.00 | 15.00 | 17.75 | 15.00 | 18.00 | 18.00 |
| Portland Cement | Excl. of containers | Bbl. | 3.25 | 3.60 | 3.43 | 2.95 | 3.40 | 3.10 | 3.50 | 2.85 | 3.50 | 3.00 | 3.40 | 2.75 | 2.75 | 3.20 | 3.00 | 3.20 | 3.00 | 3.35 |
| Yellow Pine No. 1 | Dimension 2x4-16' S1S1E | M | .... | .... | .... | 48.00 | 48.00 | 40.00 | 32.00 | .... | .... | 30.00 | 40.00 | 45.00 | 50.00 | 46.00 | 40.00 | .... | .... | 50.00 |
| Douglas Fir No 1 | Dimension 2x4-16' S1S1E | M | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45.00 | 47.00 | .... |
| No. Carolina Pine No. 1 | Dimension 2x4-16' S1S1E | M | .... | .... | .... | .... | 48.00 | .... | .... | 50.00 | 24.00 | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Common Boards No. 1 | 1x6 | M | 55.00 | 55.00 | 45.00 | 45.00 | 47.00 | 42.50 | 32.00 | 50.00 | 25.00 | 30.00 | 40.00 | 42.00 | 42.00 | 50.00 | 45.00 | 43.00 | 47.00 | 47.50 |
| Y. P. Flooring Edge Grain "C" | 1x4-10'-16' | M | 110.00 | 125.00 | .... | .... | .... | 135.00 | .... | 100.00 | 95.00 | .... | .... | 75.00 | 75.00 | 105.00 | 105.00 | .... | .... | 95.00 |
| Douglas Fir V. G. No. 2 | 1x4-10'-16' | M | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 85.00 | 85.00 | .... |
| Red Cedar Shingles | Extra clear 16" 5 to 2 | 100 sq. ft. | .... | 6.20 | 6.00 | 6.25 | 6.75 | 11.20 | 7.20 | 7.25 | .... | .... | 5.50 | 6.00 | 7.00 | 5.85 | 6.80 | 5.40 | 5.25 | 6.50 |
| Cypress Shingles | Extra clear 16" 5 to 2 | 100 sq. ft. | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 6.30 | .... | .... | .... | .... |
| Composition Shingles | Crushed slate surfaced | 100 sq. ft. | .... | .... | .... | 6.00 | 6.25 | .... | 5.48 | 6.25 | 6.25 | 6.25 | 6.00 | 6.25 | 6.00 | 6.90 | .... | .... | 7.50 | 6.50 |
| Gypsum Plaster Board | 3/8" | 1,000 sq. ft. | .... | 48.00 | 50.00 | 37.50 | 45.00 | .... | 40.00 | 32.00 | 35.00 | .... | 30.00 | 45.00 | 40.00 | 45.00 | 45.00 | .... | 32.00 | .... |
| Lime | Hyd. Com. | Ton | 25.00 | 20.00 | 26.00 | 23.00 | 22.00 | .... | 17.50 | 18.00 | 18.50 | 17.50 | 18.00 | 20.00 | 18.00 | 25.00 | 20.00 | 25.00 | 24.00 | 17.50 |
| Building Sand | | Cu. yd. | 1.75 | 2.75 | 1.65 | 2.50 | 2.50 | 2.00 | 2.25 | 3.50 | 1.00 | .... | 2.75 | .... | 2.25 | 2.25 | 2.00 | 2.70 | .... | 2.50 |
| Crushed Stone | 3/4" | Ton | 3.25 | 2.50 | .... | 5.50 | 3.50 | .... | .... | 3.00 | 3.00 | 4.40 | 2.35 | .... | 2.50 | 3.20 | 2.60 | .... | .... | .... |
| Wire Nails | | Keg | 4.00 | 5.00 | 5.05 | 3.50 | 3.50 | 3.55 | 4.05 | 4.00 | 4.00 | 3.95 | 4.00 | 3.75 | 3.85 | 4.60 | 3.80 | 5.50 | .... | 3.80 |
| Window Glass | Single A 10"x12" | 50 sq. ft. | 5.40 | .... | 4.27 | .... | .... | 4.80 | 5.80 | 5.25 | .... | .... | 3.90 | 4.25 | 5.00 | 5.10 | 4.34 | .... | 6.00 | 4.00 |
| Hollow Tile | 8"x12"x12" | Each | .30 | .30 | .32 | .20 | .21 | .20 | .20 | .26 | .17 | .... | .... | .... | .17 | .22 | .23 | .... | .19 | .18 |
| Cast Iron Soil Pipe | 4" E.H. 13 lbs. per ft. | Ton | .... | .... | .... | 55.00 | .... | 59.80 | .... | 88.00 | .... | .... | .... | .... | 83.00 | 106.25 | 58.52 | 97.02 | .... | .... |
| Steel Pipe | 1" galv. | 100 ft. | .... | .... | .... | 9.86 | .... | 9.88 | 10.00 | 10.00 | 11.87 | 9.46 | .... | .... | 9.50 | 11.95 | 9.53 | 16.00 | .... | 10.40 |
| Reinforcement Bars | 3/4" square | 100 lbs. | 3.50 | .... | .... | 3.50 | .... | 3.60 | 3.35 | 3.50 | 4.75 | 5.06 | 3.75 | .... | 3.70 | 4.00 | 4.00 | .... | .... | .... |
| Structural Steel | Fab. 6" I-beams | 100 lbs. | 5.00 | .... | .... | 3.25 | .... | 3.75 | 4.50 | 6.00 | 5.00 | 5.00 | .... | .... | 4.70 | 6.50 | 4.50 | .... | .... | .... |
| White Lead | Dry | 100 lbs. | 12.50 | 14.00 | 14.50 | 14.00 | .... | 14.25 | .... | 14.00 | 14.75 | 14.75 | 14.00 | 14.00 | 13.00 | 15.25 | 12.50 | 16.00 | .... | 13.50 |
| Zinc Oxide | Am. process lead free | 100 lbs. | .... | .... | .... | 15.00 | .... | .... | 15.00 | .... | 20.00 | 20.00 | .... | .... | .... | .... | 15.00 | .... | .... | .... |
| Gypsum Plaster | Neat | Ton | 24.00 | .... | 26.00 | 22.00 | 24.00 | 19.00 | 19.50 | 19.00 | 19.00 | 21.50 | 18.00 | 17.00 | 17.00 | 24.00 | 21.00 | 21.00 | 14.50 | 19.00 |
| Linseed Oil | Raw in bbls. | Gal. | .... | 1.04 | 1.35 | .92 | .... | 1.00 | 1.12 | 1.30 | 1.05 | 1.05 | 1.18 | .... | 1.15 | 1.55 | 1.00 | 1.50 | .... | 1.00 |
| Roofing Slate | No. 1 ribbon | 100 sq. ft. | .... | .... | .... | 13.50 | .... | .... | 13.50 | 12.50 | .... | .... | .... | .... | 17.00 | 12.00 | 16.00 | .... | .... | 13.50 |
| Tar Paper, Roofing | 2-ply 75 lbs. per roll of | 100 sq. ft. | .... | 2.75 | .... | 2.10 | .... | .... | .... | .... | .... | 1.95 | 2.25 | 2.75 | 2.75 | 2.75 | .... | .... | 3.75 | 2.25 |
| Rosin Sized Sheathing | 3-ply 30 lbs. per roll of | 500 sq. ft. | .... | .... | .... | 1.35 | 1.40 | 1.25 | 1.50 | 1.25 | .... | .... | 1.40 | 1.50 | 1.10 | 1.40 | .... | 1.80 | 1.50 | 1.20 |

| | | | New York | | | | Ohio | | | | Iowa | | | | Wash. | Ore. | Wis. | Ariz. | Cal. | Mo. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodities | Size or Condition | Unit | Poughkeepsie | Syracuse | Rochester | Buffalo | Cleveland | Akron | Lorain | Dayton | Waterloo | Des Moines | Council Bluffs | Spokane | Seattle | Portland | Milwaukee | Tucson | Los Angeles | Kansas City |
| Common Brick | | 1,000 | 20.00 | 20.00 | 17.75 | 23.00 | 16.00 | 16.00 | 21.00 | 18.00 | 16.50 | 19.00 | 16.50 | .... | 15.00 | 20.00 | 13.50 | 15.00 | 15.50 | 16.50 |
| Portland Cement | Excl. of containers | Bbl. | 2.90 | 3.30 | 3.35 | 3.03 | 3.40 | 3.50 | 3.50 | 3.50 | 2.90 | 3.10 | 2.90 | .... | 3.00 | 3.55 | 2.40 | 3.60 | 3.36 | 2.70 |
| Yellow Pine No. 1 | Dimension 2x4-16' S1S1E | M | .... | 60.00 | .... | 55.00 | 55.00 | 45.00 | 55.00 | 55.00 | 50.00 | 52.00 | 50.00 | .... | .... | .... | .... | .... | .... | 44.00 |
| Douglas Fir No 1 | Dimension 2x4-16' S1S1E | M | 47.00 | .... | 56.00 | 60.00 | .... | .... | .... | .... | 50.00 | 52.00 | 48.00 | 30.00 | 24.00 | 24.00 | .... | 62.00 | 41.50 | 44.00 |
| No. Carolina Pine No. 1 | Dimension 2x4-16' S1S1E | M | .... | 42.00 | 48.00 | .... | .... | .... | .... | 52.50 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Common Boards No. 1 | 1x6 | M | 38.00 | 39.00 | 45.00 | 50.00 | 48.00 | 45.00 | 50.00 | .... | 45.00 | 54.00 | 48.00 | .... | 22.00 | 24.00 | 40.00 | 57.00 | 40.00 | 50.00 |
| Y. P. Flooring Edge Grain "C" | 1x4-10'-16' | M | 130.00 | 105.00 | 130.00 | .... | 90.00 | .... | 105.00 | .... | 95.00 | 106.00 | 110.00 | .... | .... | .... | .... | .... | .... | 105.00 |
| Douglas Fir V. G. No. 2 | 1x4-10'-16' | M | .... | 90.00 | .... | 115.00 | .... | .... | .... | 90.00 | 95.00 | 95.00 | 98.00 | .... | 65.00 | 58.00 | .... | 95.00 | 82.75 | 85.00 |
| Red Cedar Shingles | Extra clear 16" 5 to 2 | 100 sq. ft. | .... | .... | 6.00 | 6.75 | 6.00 | 5.75 | 6.40 | 6.20 | 6.50 | 6.50 | 6.25 | .... | 3.75 | .... | 5.75 | 5.50 | 4.06 | 6.00 |
| Cypress Shingles | Extra clear 16" 5 to 2 | 100 sq. ft. | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Composition Shingles | Crushed slate surfaced | 100 sq. ft. | .... | 6.00 | .... | .... | .... | .... | .... | 6.50 | 7.50 | 6.00 | .... | .... | .... | .... | 6.50 | .... | .... | 5.75 |
| Gypsum Plaster Board | 3/8" | 1,000 sq. ft. | 50.00 | 32.50 | 30.00 | 45.00 | 32.00 | 27.60 | .... | .... | 36.00 | 40.00 | 35.00 | .... | 35.00 | 40.00 | 40.00 | 50.00 | 35.00 | 32.50 |
| Lime | Hyd. Com. | Ton | .... | 20.00 | 20.00 | 16.00 | 20.00 | 20.00 | 17.00 | 15.20 | 20.00 | 20.00 | 21.00 | .... | 23.00 | 26.00 | 15.00 | 30.00 | 26.50 | 24.00 |
| Building Sand | | Cu. yd. | 2.75 | 1.80 | 2.25 | 1.28 | 2.50 | 2.50 | 2.75 | 2.00 | 1.50 | 2.00 | 3.50 | .... | 1.75 | 2.00 | 1.75 | 1.25 | 1.75 | 1.80 |
| Crushed Stone | 3/4" | Ton | 2.60 | 2.25 | 2.25 | 1.30 | 3.50 | 3.25 | 2.65 | 2.00 | 3.00 | 4.30 | 4.00 | .... | .... | .... | 2.67 | 3.00 | 3.10 | 2.10 |
| Wire Nails | | Keg | 5.02 | 4.00 | 4.25 | 4.25 | 3.90 | 3.80 | 3.15 | 3.90 | 4.50 | 4.25 | .... | 4.85 | 4.35 | 4.50 | 3.80 | 6.00 | 4.50 | 4.20 |
| Window Glass | Single A 10"x12" | 50 sq. ft. | .... | 4.50 | 4.20 | 4.20 | .... | 4.50 | .... | 4.50 | 5.25 | 4.75 | .... | 4.43 | 4.00 | 5.00 | .... | .... | 4.38 | 4.50 |
| Hollow Tile | 8"x12"x12" | Each | .23 | .25 | .18 | .20 | .18 | .17 | .19 | .21 | .17 | .... | .... | .20 | .20 | .20 | .17 | .18 | .20 | .17 |
| Cast Iron Soil Pipe | 4" E.H. 13 lbs. per ft. | Ton | .... | 80.00 | 73.15 | 63.05 | .... | 71.82 | .... | .... | 82.00 | 90.00 | .... | 88.00 | .... | 113.00 | .... | .... | 75.19 | .... |
| Steel Pipe | 1" galv. | 100 ft. | .... | 10.51 | 10.52 | 10.00 | .... | 10.36 | .... | 10.57 | 12.00 | 11.00 | .... | 11.50 | 10.62 | .... | .... | .... | 11.30 | 11.20 |
| Reinforcement Bars | 3/4" square | 100 lbs. | 4.50 | 4.00 | 3.60 | 2.75 | .... | 3.90 | 3.95 | .... | 4.00 | 3.50 | 3.25 | 4.40 | 3.00 | 4.00 | .... | 4.50 | 4.25 | 3.59 |
| Structural Steel | Fab. 6" I-beams | 100 lbs. | 5.50 | .... | 4.50 | 3.65 | .... | 3.50 | .... | 3.50 | 4.95 | 5.25 | .... | .... | 6.00 | 5.50 | 6.00 | .... | 6.00 | .... |
| White Lead | Dry | 100 lbs. | .... | 14.25 | 12.83 | 14.00 | 14.00 | 14.00 | .... | 14.50 | 14.50 | 14.50 | 15.50 | 14.00 | 13.25 | .... | 14.00 | 15.00 | 13.50 | 14.13 |
| Zinc Oxide | Am. process lead free | 100 lbs. | .... | .... | .... | .... | 14.00 | .... | .... | 15.00 | .... | 14.75 | .... | 14.00 | .... | .... | .... | .... | 13.00 | 10.00 |
| Gypsum Plaster | Neat | Ton | 21.00 | 19.25 | 18.00 | 17.00 | .... | 19.00 | 17.20 | 18.00 | 18.00 | 18.00 | 17.00 | 21.00 | 21.00 | 24.00 | .... | 20.00 | 17.80 | .... |
| Linseed Oil | Raw in bbls. | Gal. | .... | 1.05 | 1.33 | 1.19 | .90 | .98 | .... | 1.20 | 1.30 | 1.20 | .... | 1.04 | 1.06 | 1.25 | 1.04 | .... | 1.04 | 1.19 |
| Roofing Slate | No. 1 ribbon | 100 sq. ft. | .... | .... | 15.00 | .... | .... | 13.00 | .... | 15.00 | 18.00 | 18.00 | .... | .... | .... | .... | .... | .... | .... | .... |
| Tar Paper, Roofing | 2-ply 75 lbs. per roll of | 100 sq. ft. | .... | 2.25 | 2.25 | 2.00 | 2.50 | 2.75 | .... | .... | 3.25 | 2.75 | .... | 2.82 | .... | .... | .... | 3.50 | 3.75 | .... |
| Rosin Sized Sheathing | 3-ply 30 lbs. per roll of | 500 sq. ft. | .... | 1.50 | 1.25 | 1.50 | .90 | .85 | .... | .... | 1.50 | 1.40 | 1.40 | 1.28 | 1.20 | 1.80 | .... | 1.75 | 1.50 | 1.05 |

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## A SURVEY OF IMPORTANT CURRENT ARTICLES ON BUILDING ECONOMICS AND BUSINESS CONDITIONS AFFECTING CONSTRUCTION

The Editors of this Department select from a wide range of publications matter of definite interest to Architects which would otherwise be available only through laborious effort

### BUILDING DURING WINTER MONTHS

**Address Delivered by Alfred S. Alschuler, Architect, Chicago, at Fifth Annual Meeting of the Associated General Contractors of America, La Salle Hotel, Chicago Jan. 23, 1924.**

BUILDINGS are constructed not only of brick, steel and wood, but with every bit of mortar there is mixed a certain amount of sentiment; a dream long visioned to be materialized; a vision long anticipated fully realized. For it is this human hope and ambition to own a home to shelter one's family, to provide meeting places where human beings may gather for mental or spiritual improvement, or to house growing industries in which all one's energies are centered—it is for the realization of such hopes and dreams that buildings are transformed from visions into substance.

All this may at first glance seem to be entirely foreign to the subject of this paper, but upon further thought you will realize that this hope or sentiment, which plays such an important part in human affairs, is, after all, affected and influenced, not only by material considerations, but largely by what we are pleased to call "psychological conditions." The man who has been saving for years to build a home for his family or for his industry usually puts off the final decision to act until his mind is made up,—or, to put it in other words, until the mood strikes him. It is hardly necessary to say that such moods in human beings follow closely other natural phenomena, and that spring is the most likely and winter the least natural time for such moods to be brought about and decisions reached. There is daily evidence of such moods, easily corroborated by all salesmen who prefer to solicit a customer in sunshiny weather and would save their efforts on dark or gloomy days. So it is this psychological aspect which must be considered in trying to overcome the prejudice against and inertia toward winter operation.

I have made an analysis of various charts showing monthly operation over a period of years, and have assembled this information in a new chart. This chart indicates the average monthly operation over a period of years in the larger cities of the United States which are influenced by climatic conditions. This chart represents a very large percentage of the work done in the United States, and clearly indicates a season of tremendous activity from March 1 to October 1, a gradual decline for October and November, and a sharp decline for December, January and February. It is unnecessary to point out the tremendous advantage arising therefrom and affecting both capital and labor where such seasonal operation exists and the desirability of overcoming this as far as possible. This condition varies considerably according to climate, but for present purposes I have assumed a belt or zone including Chicago and New York in which conditions affect a very large proportion of the building operations of this country which are carried on.

To go into this subject extensively would require a careful analysis of each group or class of buildings, as each group is subject to slightly different influences. I will, however, consider them briefly:

Office building projects in some cities are influenced largely by the fact that they must be ready for May 1 renting or else suffer vacancies for a considerable period. To meet this condition usually compels the starting of large operations about May 1, carrying on at a top speed through the summer and fall to enclose the building at the earliest possible date, and then the carrying on of all interior work during the winter months. This class of building provides work substantially over the entire year. There is not much latitude permitted in the starting of such operations unless other renting conditions prevail. Even under other rental conditions this class provides practically an all-year occupation, as it takes substantially a year to complete such structures if they are of any considerable size.

Places of amusement, which furnish much work, are usually desired for completion in time for fall opening. These, therefore, depending on their sizes, must start either in early spring or the preceding fall and carry on right through the winter, so that this class as well as office buildings should normally provide a considerable amount of winter work.

Public works and utilities furnish a class of work which should not be influenced by seasonal activities and which should be used as a reservoir to draw upon both in times of building depression, and, if required during boom periods, should be carried on during the least busy months. This would surely benefit all parties concerned. The public owning the buildings or paying revenue for their support would profit by reduced building cost. Contractors and workmen would gain by being occupied during the winter months, and the building public would further profit by having that much less work thrown into the summer months.

Apartment houses are to a large extent built by a class known as "speculative builders" on small margins of capital and must be turned out for completion just prior to the renting season. If May 1 is the most popular renting date, I believe starting in fall and going on through the winter would be both possible and highly profitable. Where no fixed rental date exists, a campaign of education for winter building might be effective.

Residences are very largely influenced by the mood of the builder, and I believe something could be done here to offset the popular prejudice against winter building.

I have left until last the group of industrial buildings, with which I happen to be most familiar. In the past, this was subject to the same influences as already mentioned, but within the past five years, I have noticed a considerable change of attitude. With the rapid expansion of business certain owners have decided to expand to meet the pressure regardless of the time of year. Others having seasonal businesses of their own have been compelled to plan to move according to their business needs. Still others, planning new buildings fitted to their requirements, in order to reduce their operating costs, likewise seek in the face of high building costs to take advantage of every possible opportunity to keep down their investments. These classes I believe are rapidly growing, and the result, in my office at least, has been a steady increase of winter work. It is here that a large opportunity is afforded for education, showing the advantages of winter operations.

To accomplish this, it is first necessary to overcome existing prejudices.

These are mainly the established fear of damage, particularly in reinforced concrete buildings, resulting from cold, and the thought of decreased labor efficiency or increased cost resulting therefrom. That there is some ground for this assumption is understood. The developments and improvements in method of construction in recent years are not generally understood. For example, the class of reinforced concrete buildings are probably more affected by cold than any other kind of construction, and yet they are being carried on more and more and without harm.

You gentlemen, as contractors, are familiar with the numerous methods by which materials are heated and by which the form work and reinforcing steel is cleared of ice and snow during the winter months, and it is not my intention to go into the numerous details of these provisions. One feature, however, which has been used on several of our concrete buildings of especial interest is the use of the form work for the floor above that which is being poured as a protection over the concrete. By standing the 4 x 4 uprights on wedge-shaped concrete blocks which rest on the form of the slab to be poured, the forming for the next floor above can be practically completed. In case of heavy snow or rain, tarpaulins laid over this form work give a watertight protection, as well as enclosing the space for temporary heating. By these methods, and including the use of chemicals under certain conditions, building operations are facilitated so that, except under most severe conditions, work can be carried on without interruption. Although it is necessary to prepare and provide all necessary precautions, it frequently is the case that winter weather turns out to be mild and no difficulties whatever are encountered. In this case, provided the right kind of contract is entered into, both owners and contractors will gain.

During the last winter, one heavy reinforced concrete structure 10 stories in height, containing 16,000 square feet on each floor, through the efforts of an energetic contractor, was carried up from the first floor to the roof in less than 70 days, or 60 actual working days. Another concrete building, the previous winter, containing 6,000 square feet per floor was carried up 12 floors in 100 days. This included bad weather conditions, holidays and some days when work was held back for the lower floors to set; some floors were poured in five working days from the time of completing the previous floors. My experience leads me to believe that it is largely a matter of contractors. Some overcome all difficulties, whereas others sink under them.

The omission of the top finish, and placing this after the building is enclosed and heated, greatly expedites work. When this is done, great care must be used to see that the finish adheres thoroughly. This requires considerable skill to absolutely assure adhesion, as frequently the variation of the amount of water contained and the exact time of evaporation play an important part.

It is hardly necessary to mention here the various methods which can be employed to safeguard and amply protect foundations and masonry, and it might be profitable to conduct a campaign of education along these lines, so that the public will not look with fear upon winter construction. After a building is enclosed and protected from the elements, the setting of temporary radiators after the installation of the heating system of course expedites the work.

The inducement for the prospective builder, as we all know, lies in the fact that there is usually a better supply of labor during the winter months. This has been especially true during the last four years, when the large flood of building operations during the busiest period has created such a shortage of labor and material as to bring about an unhealthy condition for both contractor and owner. The contractor who has figured on the established wage scale has too often, to his sorrow, found his men soldiering on the job and himself helpless in the situation. A command would only result in losing his help altogether and frequently compel him, in order to complete his work, to raise the wages or pay overtime as an inducement to obtain workers from other contractors who in turn would suffer the same experience and would finally be compelled to bid against the first contractor for the return of their former mechanics. After a few experiences of this nature, the contractor would naturally endeavor to protect himself in future work, and the succeeding owner would be compelled to pay the penalty of this competition.

A better distribution of work throughout the year would tend to decrease this tendency and likewise costs thereby. Another evil which might be eliminated arises from the fact that unemployment drives workers into other fields or climates, and many of them do not return, thereby creating a still further economic loss. It is hardly necessary to say here that the continuous overhead of a contractor's organization is a considerable burden to him during dull seasons and is a corresponding inducement for him to reduce his margin of profit for continuous employment, which will result in a decided advantage to the owner who can be educated to the advantages of building during the winter period.

I believe a general publicity campaign directed toward the architect would be beneficial. In order to obtain results, the coöperation of the architect or engineer is absolutely vital. If winter work is under consideration, the conditions to be encountered should be clearly anticipated. I believe it would be advisable, where time is of importance, to say in advance that the contract should be based on actual working days. Otherwise the contractor will, or rather should, protect himself by ample allowance for bad weather. Thus the cost is increased, and if moderate weather prevails, the owner is likely to be the loser. It is also necessary to definitely consider work as a winter job in the writing of specifications. In other words, if the contractor's attention is called to the fact that he must figure on thawing out frozen ground, on providing a certain amount of temporary heat, on temporary enclosures at door and window openings, and in general on carrying on his work irrespective of weather conditions, he will then allow enough in his original bid to cover the cost of such work and will not either slow down or stop work or ask the owner for extras when cold weather sets in. In order to avoid any question at the completion of the work relative to the time element, it is well to specify exactly what weather conditions and temperatures are necessary, so that a "working day" is clearly defined in advance.

A general publicity campaign might be directed toward the public as well as the contractors. A chart showing clearly the fluctuations, as well as a statement showing all the facts clearly and indicating the advantages to be gained, would be valuable and in time should produce results. A thorough study of the situation by committees representing the various industries throughout the sections of the country affected, and the submitting of their report for discussion among the various local organizations should bring a wider range of experience and knowledge of its practical application to the individual contractors. A campaign carrying a popular slogan, obtained possibly by the offering of prizes to the public, would tend to arouse a general interest in the subject.

It should be pointed out clearly that in many cases owners will profit by proceeding with their work regardless of weather conditions, when they can make savings of interest as well as taxes on investments lying idle. It is surely safe to say conservatively that winter construction will cost an owner no more than summer work.

In all of these elements which enter into the general question of improving building conditions, a careful analysis of the situation by both architect and owner, and frequently consultation with an intelligent contractor will produce savings in cost of construction and result in a completed enterprise instead of an abandoned enterprise. This process repeated many times will produce healthier, saner and more satisfactory conditions in the building industry.

(The chart referred to in the third paragraph may be obtained by addressing Ira L. Smith, 1038 Munsey Building, Washington, D. C.)

# THE PRESENT SITUATION IN THE BUILDING INDUSTRY

THE annual building survey of the Copper & Brass Research Association for 1923 sets the total expenditure for building in 1923 at $5,922,900,000. Estimated construction for 1924 totals $4,835,935,000. The distribution by districts of the 1923 expenditure for building construction is shown on the accompanying map, while the chart shows the trend of building from 1910 to date.

The tremendous acceleration of the rate of expenditure during the two years just past has, the association's survey shows, resulted in a reduction of the war shortage by some $5,000,000,000, so that the industry is moving rapidly toward normal conditions.

Curve No. 1 indicates the Total Construction Requirement each year. It includes both the Shortage at the End of Each Previous Year (Curve No. 4) and the Normal Yearly Growth (Curve No. 3), and shows the total amount of construction needed to meet all requirements. It will be noted that this curve is plotted to the right of the year line. This has been done on the assumption that the total requirement is not known at the beginning of the year. The winter months are devoted to developing plans, etc., so that the total is not definitely established until about April 1, when work is started. While this is an arbitrary assumption, it is used because it permits a better presentation.

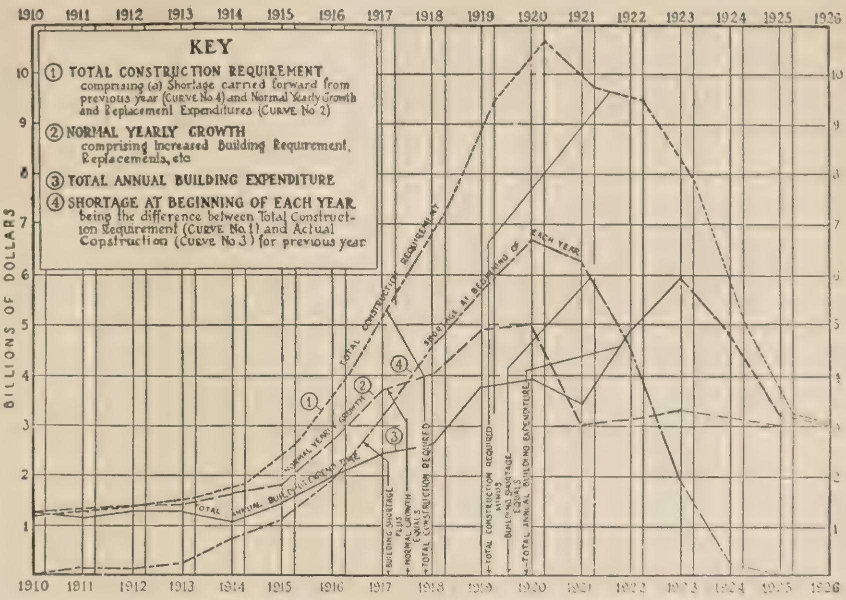
Curve No. 2 shows the Normal Yearly Growth in the building field. The population of the country is increasing at the rate of 4,620 per day. Allowing five persons to a family, 337,240 houses or apartments are required yearly to take care of new inhabitants. Other items which are included are the cost of replacements, alterations, repairs, and new construction necessary to supply the needs of increased population, such as churches, hospitals, schools, stores, theaters, etc.

Curve No. 3 shows the Total Building Expenditure yearly in the United States.

Curve No. 4 indicates the Shortage at the Beginning of Each Year, or the "carry over." This shows the money value of work projected or needed each year but for various reasons not executed.

As far back as 1914 Expenditure fell behind Normal Growth, and a real shortage began to develop. The two curves diverge widely during the war years, with a corresponding increase in the Total Requirements. Not until 1921 do the two curves approach each other. At this time the present boom started, and we see an enormous increase in building culminating in the 1923 peak.

Such an expenditure as $11,000,000,000 in two years resulted in a decrease in the shortage and a marked reduction in the total requirements, as may be seen in this tabulation:



Trend of Building in the United States, 1910-1923

| | |
|---|---|
| April 1, 1921—Total Requirement | $9,806,135,000 |
| Construction, 1921 | 3,442,300,000 |
| Shortage Jan. 1, 1922 | 6,363,835,000 |
| Normal Growth, 1922 | 3,125,000,000 |
| April 1, 1922—Total Requirement | 9,488,835,000 |
| Construction, 1922 | 4,910,000,000 |
| Shortage Jan. 1, 1923 | 4,578,835,000 |
| Normal Growth, 1923 | 3,305,000,000 |
| April 1, 1923—Total Requirement | 7,883,835,000 |
| Construction, 1923 | 5,922,900,000 |
| Shortage Jan. 1, 1924 | 1,960,935,000 |
| Normal Growth, 1924 (estimated) | 3,125,000,000 |
| April 1, 1924—Total Requirement (estimated) | 5,085,935,000 |
| Construction, 1924 (estimated 95%) | 4,835,935,000 |
| Shortage Jan. 1, 1925 (estimated) | $250,000,000 |

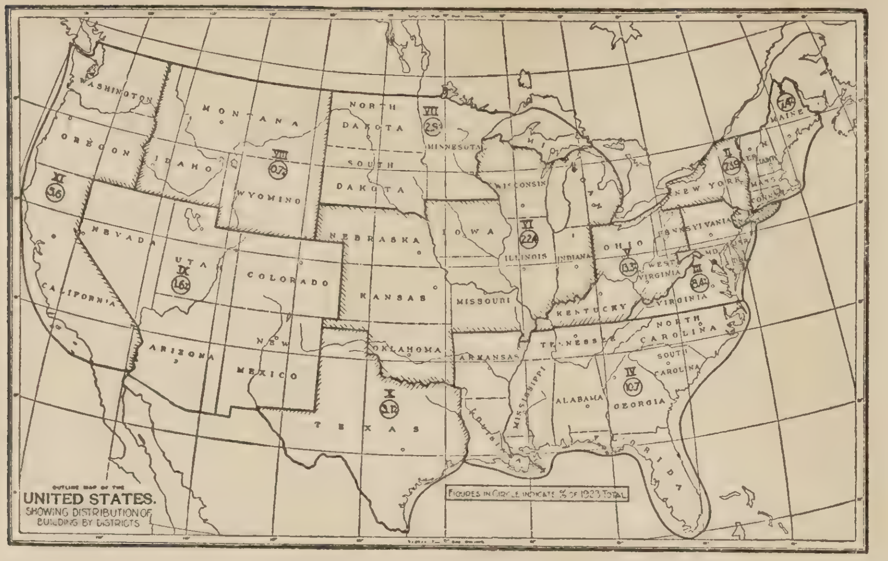
From the foregoing it is evident that the peak has been reached and that from now on there will be a gradual decrease in volume until a normal market of approximately $3,000,000,000 is reached. The curves clearly indicate that the tremendous war shortage of over $10,600,000,000 of 1920 has been overcome and that 1924 sees a potential market of slightly more than $5,000,000,000. A conservative estimate of the total volume of construction for 1924 is $4,835,935,000, or approximately 95 per cent of the total requirement.

The figures given here and the data from which the curves are plotted are obtained from separate analyses of three different sources of information, namely, (1) building permits in various cities throughout the country; (2) reports from Chambers of Commerce in the principal cities and states, and (3) estimates by architects of projects handled by them during the year. With sources so widely divergent considerable variation in estimates was to be expected. The curves represent a determination of these variations and a compilation of the results of surveys made by different authorities. It is felt that they represent as nearly as possible the present status of the industry and clearly indicate the trend for 1924.

In predicting the volume of business for 1924 no allowance has been made for the many variables outside of the building industry which have a marked effect upon it. The general prosperity of the country is closely reflected in building, and while it is evident that the peak of 1923 will not be reached in 1924, the need is so great that, unless a decided upset in national affairs occurs, the volume for the year will be at least as great as in 1922, itself a record-breaker. The importance of Curve No. 2—Normal Yearly Growth—is evident, for from it are obtained the other curves as is indicated by two simple formulæ on the chart. This curve represents dollars rather than physical volume required, and, as the purchasing power of the dollar is subject to variation, the curve is correspondingly affected. The amount of fluctuation is determined from the Index Numbers of Costs, etc., issued by the Department of Labor. The variation due to these is particularly noticeable in the years 1919-1921, when prices rose sharply and then declined. The gradual increase since 1921 is also indicated.

At the present rate of increase of population, over $2,250,000,000 goes into new housing. Another $1,000,000,000 is none too much to take care of replacements, repairs and alterations, and the new construction necessary to supply the increasing needs of the country. Estimates have been prepared showing that for farm buildings alone (stables, sheds, etc.) the expenditure of $78 per farm would total annually $500,000,000 for the entire country.

Expenditures for 1923 are divided into these different classifications:



Distribution of Building Industry Throughout the United States

| Type of Building | Expended 1923 | Per cent |
|---|---|---|
| Apartments | $1,066,122,000 | 18.0 |
| Business buildings | 651,519,000 | 11.0 |
| Dwellings | 710,748,000 | 12.0 |
| Farm buildings | 118,458,000 | 2.0 |
| Hospitals | 325,759,500 | 5.5 |
| Hotels | 562,675,500 | 9.5 |
| Industrial buildings | 651,519,000 | 11.0 |
| Military and naval buildings | 59,229,000 | 1.0 |
| Public buildings | 177,687,000 | 3.0 |
| Recreational buildings | 414,603,000 | 7.0 |
| Religious buildings | 384,988,500 | 6.5 |
| Schools | 799,591,500 | 13.5 |
| | $5,922,900,000 | |

The percentage distribution in dollars, of the building industry throughout the United States, is shown on the outline map. The association has divided the country into 11 districts of generally similar industrial characteristics. Exceptions to this division are of course the Pacific states, Texas, and the large Missouri-Mississippi Valley group, stretching west from Indiana to Nebraska. The percentages shown on the map and in the tabulation below are figured from the populations and gross incomes of the various districts in 1921, the latest available data. New York state (District II) alone has a larger percentage than any of the others. Texas (District X) exceeds North and South Dakota and Minnesota combined (District VII). The Rocky Mountain states (Districts VIII and IX), comprising eight states and the largest area, represent only 2.3 per cent of the total. The Pacific Coast states (District XI) show a surprisingly large percentage, as do the Southern states (District IV).

Here is a tabulation of the districts and the individual totals for 1923:

| District | Percentage | Total, 1923 |
|---|---|---|
| I. New England states | 7.4 | $438,294,600 |
| II. New York state and northern New Jersey | 23.9 | 1,415,573,100 |
| III. Southern New Jersey, eastern Pennsylvania, Delaware, Maryland, D. C., Virginia | 8.4 | 497,523,600 |
| IV. North and South Carolina, Georgia, Florida, Alabama, Louisiana, Mississippi, Arkansas, Tennessee | 10.7 | 633,750,300 |
| V. Western Pennsylvania, Ohio, West Virginia, Kentucky | 13.3 | 787,745,700 |
| VI. Wisconsin, southern Michigan, Indiana, Illinois, Iowa, Missouri, Nebraska, Kansas Oklahoma | 22.4 | 1,326,729,600 |
| VII. North and South Dakota, Minnesota, northern Michigan | 2.9 | 171,764,100 |
| VIII. Montana, Idaho, Wyoming | 0.7 | 41,460,300 |
| IX. Nevada, Utah, Colorado, Arizona, New Mexico | 1.6 | 94,766,400 |
| X. Texas | 3.1 | 183,609,900 |
| XI. Washington, Oregon, California | 5.6 | 331,682,400 |
| | 100 | $5,922,900,000 |

## DAY LABOR OR CONTRACT?

THESE statements are taken from an address, recently delivered at the annual meeting of Associated General Contractors, by Arthur P. Bent:

"The problem we are to consider is not hypothetical. All over the country today there is a growing tendency among public officials to do public work by day labor. This is not confined to maintenance, or to minor municipal operations, but reaches to single major projects of great importance. River levees built by the federal government; highways built by states; dams and canals built by irrigation districts; asylums and hospitals by counties; schools, sewers and paving by cities—all by day labor. The real causes of this tendency are not easy to determine, but the reasons given by public officials are quite simple and specific. Chiefly they are: First, 'to save the contractor's profit.' Next, to permit of more elasticity in carrying on work—under day labor method the responsibility upon the governing bodies of knowing just what they are going to do and how, does not press heavily. Again, work can be started quicker. But back of these and other reasons lie basic causes which are not so easy to get at. Sometimes it is a desire for power and the support in authority, which comes from a large body of subservient employes. Sometimes it is just politics of the old sordid variety, less common now but not yet gone from public life.

"In the joint report of the two great California automobile clubs may be found the statement that of 300 highway jobs done by day labor, and amounting to $7,000,000, the state's accounts showed unit costs on only five jobs. On two of these five, the state first called for bids and rejected them on recommendation of the State Engineer who then undertook the work himself. The record shows these figures:

| | Engineer's Estimate | Contractor's Bid | Actual Cost to State |
|---|---|---|---|
| Excavating | $.55 | $1.10 | $1.17 per cu. ft. |
| Concrete | 4.50 | 7.50 | 10.38 " " yd. |

"In totals this means on the first job a bid of $117,000, and an actual cost of $160,000, or a loss to the state of over 37 per cent, and on the second job a bid of $43,000 and a cost of $81,000, or a loss to the state of almost 90 per cent.

"With such facts within their knowledge, what shall we think were the reasons that led state officials to continue this method to the extent of $7,000,000 worth of highways; and were their reasons typical? It is gratifying to add that the present California administration went into office under a pledge to stop this reckless waste and to carry on its public construction under public competition.

"The day labor system is fundamentally unsound. It breeds dangerous politics, encourages inefficiency, lowers construction standards, develops extravagance, decreases production, destroys individuality and lets loose that spirit of disloyalty to duty which notoriously during the war spread like a plague over the whole world. We all need the spur of competition. We all need to feel the pressure of definite responsibility. We all need the rewards of individual initiative and effort. America's splendid and amazing career fairly rests on that foundation. Listen to the words of that discouraged prophet of day labor and communism, Leon Trotsky, as they appeared recently in *The Literary Digest*: 'Our nationalized industries, even those working under exceptionally favorable auspices and well equipped, all are working at a loss. Our administrators and directors are not real masters who attend to every little detail, who watch everything, who save every minute of time and every cent of money, who work day and night caring for the needs of our plants.' The same false theory, upon which day labor rests, has benumbed the great soul of Russia, and not even her vast resources, greater than our own, will restore her."

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